



Instrumentation Scientifique de Laboratoire

FZP 5G2s



User's Manual

Historical Review

Revision index	§ concerned	Modification descriptive	Date
A		Original issue	05/15/03
B	Part 1§ 4.3.3.1	ISL Alan® manager software available on the FZP 5G2s analyzers	01/26/04
	Part 1§ 2.4	Cleaning recommendations of the detection cell	
	Part 2 § 2.3.3	Update of the end of test messages	
	Appendix B	Detailed characteristics of the RS 232C link communication protocol	
C	Part 1 § 2.1	Updating and adding of the standard methods ASTM D7153 and IP529	09/21/05
	Warning; Part 1 § 2.2.2 & 5	Adding of an advertising on Class IIIA laser detection cell hazards	
	Part 2 § 2.1	Modification of explanations concerning the Other menu	



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CUSTOMER REPORT

Reserved for public relations department

N°

Date

PURPOSE

I wish to

☐

Report an error

☐

Submit a suggestion / a comment

☐

Get more information

In the area of

☐

Hardware

☐

Software

☐

Manual

ANALYZER ENVIRONMENT (please be complete)

• HARDWARE

Type of Analyzer: FZP 5G2s

Serial N° :

Options :

☐

Parallel printer

☐

Graphic printer

☐

Plotter

☐

RS232C interface

☐

Current loop interface

☐

Other :

• SOFTWARE

Version :

ATTACHED SHEETS

☐

Listing

☐

Diskette

☐

Drawing

☐

Text

☐

Other

PROBLEM DESCRIPTION / COMMENTS

SUBMITTED BY

Name :

Company :

Address :

Phone :

Fax :

Date:

Send this report to your local Sales office or to Groupe ISL - Service Clients

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Web site: www.isl-france.com



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Caution

This ISL Analyzer has been carefully designed, manufactured and inspected for quality. It has been equipped with a number of safety features.

However, the use of this Analyzer may involve the handling of solvents, chemicals, and other potentially dangerous flammable, toxic, etc.) materials. Please exercise caution when handling these materials while operating the Analyzer.

Please:

- *read the manual*
- *wear proper protective clothing*
- *perform all suggested service procedures*
- *use care to prevent accidents*

The manufacturer accepts no responsibility for any damage or liability arising from the use of Analyzers.

Use of Non-ISL Products and Accessories. Defects or damage that result from the use of Non-ISL branded or certified Products, Accessories, Software or other peripheral equipment are excluded from warranty.



This label is located on the detection cell.

CAUTION! Laser radiation when open the detection cell: Disconnect the analyzer from the mains.

DO NOT STARE INTO BEAM: CONSEQUENCES COULD BE IRREVERSIBLE.

The use of optical instruments with this product will increase eye hazard: The FZP 5G2s is equipped with a Class IIIA laser detection cell. As the laser beam used is harmful to eyes, do not attempt to disassemble the cell. Refer servicing to qualified personnel only.



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Part 1 General

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1.Introduction

1.1. ISL company profile

We would like to take this opportunity to thank you for choosing ISL product. We are confident that you will be completely satisfied with your new Analyzer and we hope that you continue to call on us for all of your laboratory's petroleum testing needs. Before you begin, we ask you to take a few minutes to become acquainted with ISL and its history.

ISL's beginnings go back to 1975, when a group of engineers and scientists from the heart of the Northern France's petrochemical industry began seeking ways to automate petroleum testing. The neighboring industry served as an excellent research and development proving ground for their new equipment.

By the end of 70's, several quality instruments had been developed and were being marketed in Europe under ATPEM Trademark.

The most famous of these new instruments was the CPP 97, Automatic Cloud and Pour Point Analyzer. Introduced in the early 1980's, its successor, the CPP97-6, revolutionized cold flow testing enabling up to six tests automatically and simultaneously.

Adding new automatic instruments each year, ATPEM soon became a worldwide leader in automatic petroleum test instrumentation. In 1986, they expanded operations, reorganizing into the company now known as ISL.

Striving to maintain close contact with customers in over 75 countries, ISL has since grown, founded Sales & Service branches on each continent. With design, marketing, service and support operating together under the ISL roof, the company reached "a new dimension" in 1993 by obtaining ISO 9002 certification from the BVQI. Working hard to extend our quality assurance program, we received ISO 9001 certification in 1995.

Though best known for distillation, viscosity testing, cold behavior instrumentation, flash point, evaporation loss, oxidation, and asphalt testing equipment, ISL's contributions to automated petroleum testing continue to grow. With more than 10 patents to date, ISL's constant research into new technologies buttresses our precedent for ultimate precision, performance and safety. The company now offers over 20 Automatic Analyzers for different applications giving incontestable benefits to its users in increasing of test precision by elimination of operator subjectivity and human errors, while increasing productivity and reduce operator time with highest level of safety.

A worldwide distribution network supports our customers with quick, efficient service, and our highly knowledgeable service staff buttresses this relationship, providing solutions to product or application challenges.

Please visit our web site for more information: <http://www.isl-france.com> .

1.2. About this manual

This manual is made up of four main parts, entitled:

- Part I: General
- Part II: Using the FZP 5G2s with pre-installed products
- Part III: Advanced use of the FZP 5G2s
- Part IV: FZP 5G2s Maintenance

The first part presents the Analyzer and this manual content.

The second part allows the operator to carry out an initial test to determine the hydrocarbon freezing point with the FZP 5G2s, in a few steps, confidently and with no particular prior knowledge.







The third part, on the other hand, makes it possible to use the FZP 5G2s potential to the full. It is, therefore, intended rather for the knowledgeable user who is familiar with tests for determining hydrocarbon freezing points. In any case, the sensitive parts of the FZP 5G2s software, those linked to the test parameters, can be read- and write-protected by a system of passwords chosen by the user.

The fourth part, intended for service staff, explains in detail maintenance and upgrade operations of the Analyzer.

1.3. Typographical conventions

Convention	Meaning
Bold	Important words or phrases
<i>Bold Italics</i>	<u>Menus</u> or <u>buttons</u> on the LCD
Bold + SMALL CAPITALS	<u>Keys</u> on the front panel of the device

1.4. Meaning of symbols

		<i>Note</i>	<i>Important comment.</i>
		CAUTION !	<i>Call for particular care.</i>
		<i>Referral</i>	<i>Referral to a particular document (Standards) or to another manual.</i>

2. Type of Analyzer

2.1. FZP 5G2s product overview

ISL's FZP 5G2s has been designed to provide highly accurate freezing point determinations down to -100°C (-184°F) of aviation fuel. It combines a patented built-in cooling system and highly precise detection mechanism into an ultra-compact, easy to use instrument that's ready to work whenever and wherever you are. The unit automatically controls cooling and heating of specimen and uses optical detectors to monitor appearance and disappearance of hydrocarbon crystals. Selfcleaning operation speeds and simplifies testing, while novel detection cell based on patented laser beam technology assure testing of difficult and contaminated samples and assure low-temperature flow performance of aviation fuels.

The ISL FZP 5G2s analyzer complies with ASTM D7153 and IP 529 standard methods now included in MOD Def Stan 91-91 issue 5 Jet Fuel specification and test data obtained are in correlation with ASTM D2386, IP 16, ISO 3013 and JIS K2276 standard methods.

ISL has taken great care with the design and manufacture of this device and hopes it will give you every satisfaction.

2.2. Technical specifications

2.2.1. Operation in ambient conditions

- ♦ Operating temperatures : 15°C to 35°C
- ♦ Storage : -20°C (-4°F) to 40°C (104°F).

2.2.2. Features

Patented built-in cooling system:

- ♦ Self contained operation (no external connection necessary)
- ♦ Temperatures range: down to -120°C (-184°F)

Temperature measurement: Direct specimen temperature control

- ♦ Measuring instrument: Pt 100 IEC 751 probe – class A
- ♦ Resolution : +/-0.1°C (+/-0.1°F)
- ♦ Stability: +/-0.5°C

Detection:

- ♦ ISL(c) patented optical detection cell



**CAUTION ! Laser radiation when open the detection cell: Disconnect the analyzer from the mains.
DO NOT STARE INTO BEAM: CONSEQUENCES COULD BE IRREVERSIBLE.**

The use of optical instruments with this product will increase eye hazard: The FZP 5G2s is equipped with Class IIIA laser detection cell. As the laser beam used is harmful to eyes, do not attempt to disassemble the cell. Refer servicing to qualified personnel only.

2.2.3. Power supply

- ♦ Mains power supply: 100/240 VAC, 50/60 Hz
- ♦ Wattage: 150 W

2.2.4. Dimensions

- ♦ Dimensions: 250 mm (I) x 620 mm (L) x 390 mm (H)
18" (W) x 25" (D) x 18" (H)
- ♦ Weight: 26 Kg

3. Care in use

3.1. Care in the use of testing and cleaning equipment

It is supposed that operators are familiar with the handling of hydrocarbon products and that they are thus aware of the dangers and risks that attach to them.

3.2. Precautions to take when using built-in cooling Analyzers

Built-in cooling Analyzers comprise a cooling compressor that necessitates several special precautions to be respected for the long life of the Analyzer and its optimum performance:

- Avoid using the Analyzer on a vibrating surface. Surface vibrations can enter into resonance with those of the compressor and cause damage to the Analyzer.
- The optimal operating temperature for the Analyzer is around 20°C. To avoid harmful overheating of the unit:
 1. Keep the rear of the unit clear to allow heat to escape easily.
 2. Keep the ventilation holes in the side of the unit clear. They must be regularly blown clear of dust to avoid clogging and possible blocking.

4. Unpacking and installation

4.1. Care in unpacking

After unpacking, check the device and its accessories as well as any possible damage sustained in transit, which must immediately brought to the attention of the carrier so that a statement of damage can be made.

The various parts of the FZP 5G2s are carefully checked and tested before shipping. Nevertheless, it is worth checking that the equipment received corresponds to the packing list enclosed.

On taking delivery of the FZP 5G2s, unpack all these parts.

Put the Analyzer on a workbench near electrical sockets and connections to cold sources. Allow enough space for access to the rear connectors.

Leave sufficient space behind the Analyzer for cabling access and for clear ventilation.

4.2. Installing the FZP 5G2s: unlocking the shock absorbers

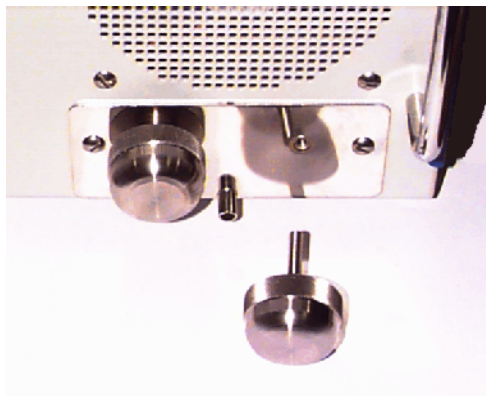
The FZP 5G2s cooling compressor is mounted on shock absorbers that must be locked during transportation. The shock absorbers is locked by bolts that screw in underneath the unit (please refer to the document DOCV226X001). To ensure that the bolts are removed after transportation the unit will not sit flat on its base until they are removed.

When unwrapping the unit:

1. Remove the shock-absorber locking bolts from underneath the unit.
2. Screw them into the special storage panel at the back of the unit as shown below.



Shock absorber locking bolt



Special storage panel for shock absorbers locking bolts.

Picture 1 and 2: Locking/unlocking the shock absorbers

4.3. Connections

4.3.1. Connection to the mains

After unpacking the FZP 5G2s the different extensions need to be connected and it should be plugged into different networks and circuits (see Picture 3 next page).

Regarding the connection of the FZP 5G2s to the mains, it should be noted that the device is built to operate from 90 to 130 and from 100 to 240 Volts, at 50 or 60 Hz, in accordance with the majority of countries where the device is marketed. The power cable corresponding to the country of sale is supplied with the device.

4.3.2. Connecting the printer

A parallel port is provided at the back of the analyzer for connecting a printer compatible with the Analyzer (using PCL-3 or ESC/P language) with which to print out test results, among other things.



Caution! The Analyzer and peripherals must be switched off before connecting any new peripherals.

4.3.3. FZP 5G2s / PC link

The FZP 5G2s Analyzer is fitted as standard with an RS 232C interface and an RS485 interface.

4.3.3.1. RS 485 serial link – Connection to the ALAN® Network

The FZP 5G2s analyzers can be connected to the ISL Alan® network (Automatic Laboratory Analyzer Network) with the ISL Alan® software developed by ISL.

This software is a multitasking software running under Windows allowing up to 31 ISL Analyzers to be connected to the same PC computer (see the illustration below). It allows data coming from different ISL analyzers to be collected and stored.

Besides multi-analyzers results database management and control (according analyzer type: run control, alarms displaying, internal parameters management...), the ISL Alan® software allows transmitting results directly to a LIMS (or even information system).



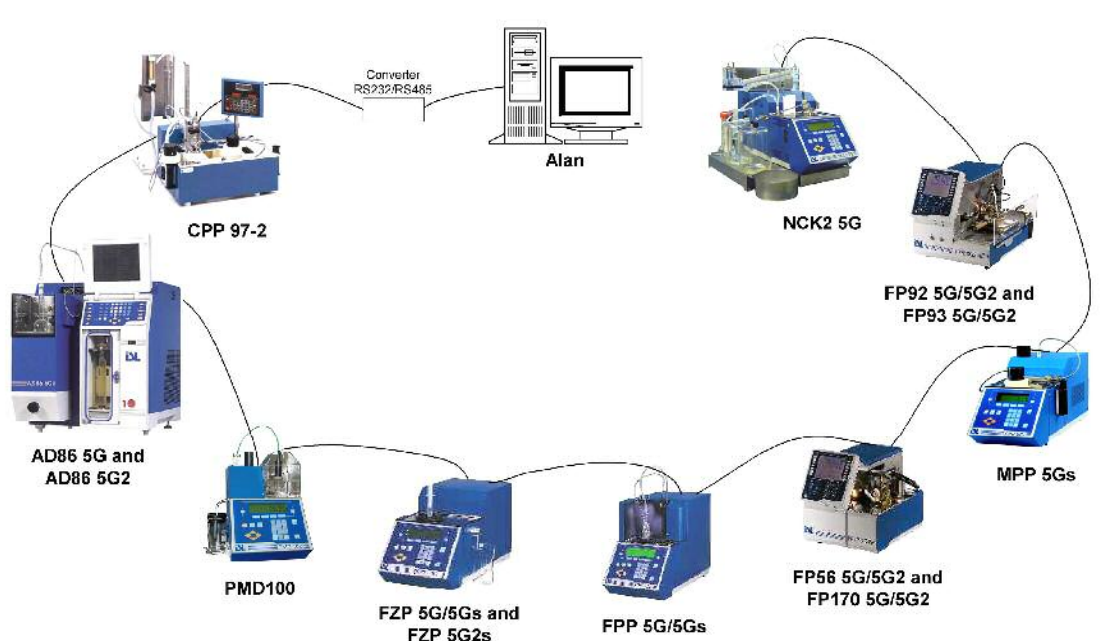
Note : The Alan® Kit is optional hardware and software package. Refer to the Alan Installation and Getting Started Manual.



Note: The RS485 communication mode has to be parameterized. Refer to the section 7.6.2 - Alan® link setup: the "PC link" menu page 3-54.

Each analyzer connects to the Alan® network via the RS485 serial interface through two ports (input/output) located on the rear panel (see Picture 3 on the next page for more explanations).

Example of an ISL Analyzers network:



4.3.3.2. RS 232 C serial link

The network input / output ports of the analyzer link interface with the Alan® network may be connected via a special adapter supplied with the analyzer to form an RS 232C serial link enabling results to be collected on a PC and for transmission to a LIMS (see Appendix B – RS232 link features on FZP 5G2s page Appendix 77 for the meaning of the messages).

Use the adapter supplied with the analyzer (see the Packing List): it has two RS 485 connectors on one side, which have to be connected simultaneously to the Analyzer's Alan input and output, and on the other side an RS 232C connector to be connected to the PC.

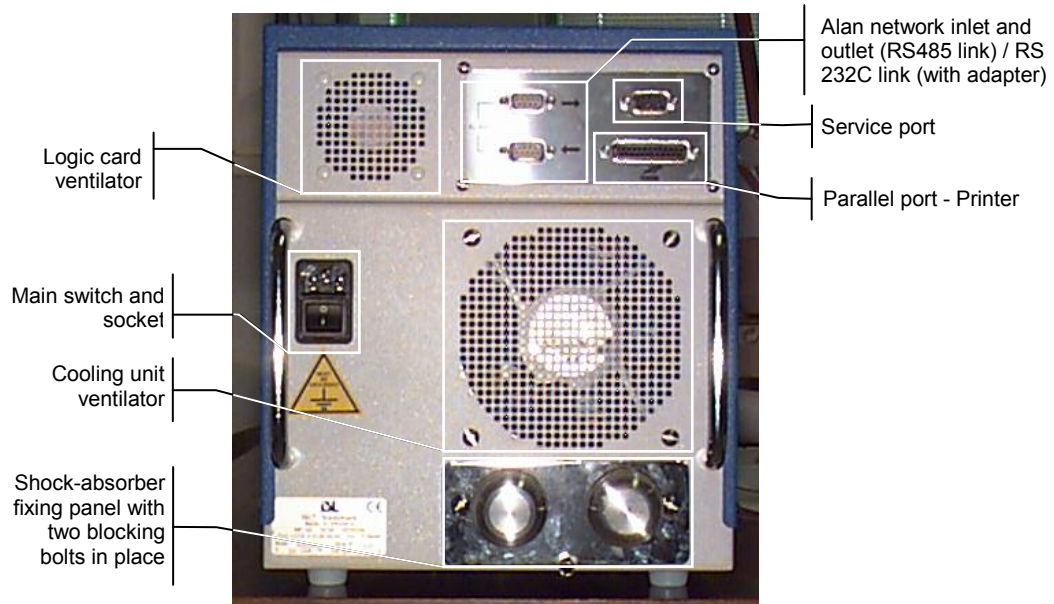


The ISL analyzers allow transmitting data according to specific customized criteria and a user defined protocol.

Note: The RS 232C communication mode has to be parameterized. Refer to the section 7.6.1 - RS232C link setup: the "RS232" menu page 3-53.

4.3.3.3. The "SERVICE" port

The FZP 5G2s has a serial « SERVICE » port as a standard fitting with which, with the help of the « ISL UDS » service software supplied, software updates can be downloaded via a PC and the contents of the memory such as the internal parameters and results can be saved for subsequent reloading (refer to the section 4.4 page 4-66 for transfer commands).



Picture 3: Rear panels and connections

5. Description of the device

The FZP 5G2s consists, broadly speaking, of two major parts:

- A user interface.
- A test bench.

The user interface will be the subject of the next section.

The extremely simplified test bench features an orifice through which, by means of a syringe (supplied), a 10-ml sample is injected for test purposes.

This volume is calculated precisely to allow in one single operation:

- The old sample to be removed and replaced by the new one.
- The cell to be cleaned, by dilution of the old sample by the new.



Caution! Cell cleaning is normally done with the next sample and a chase-n-flush technique. Do not use acetone.



All solvents are prohibited (they may cause deterioration of the cell). Use only heptane.

Note: If the cell is accidentally cleaned with a solvent, this will be rapidly rinsed with an injection from 10 to 20 ml of heptane or kerosene.



CAUTION ! Laser radiation when open the detection cell: Disconnect the analyzer from the mains. DO NOT STARE INTO BEAM: CONSEQUENCES COULD BE IRREVERSIBLE.

The use of optical instruments with this product will increase eye hazard: The FZP 5G2s is equipped with Class IIIA laser detection cell. As the laser beam used is harmful to eyes, do not attempt to disassemble the cell. Refer servicing to qualified personnel only.

By means of an appended tube, on the right side of the FZP 5G2s, the old sample can be drained into a beaker.



Picture 4: Injecting the sample.



Picture 5: Recovering the used sample.

Refer to the section 2.3 page 2-31 for the complete initiating test procedure.

6. The user interface

6.1. Front panel

The front panel of the device appears thus:



Picture 6: Front panel.

6.1.1. The LCD

The front panel of the device therefore includes an 8-line LCD which may be represented thus:

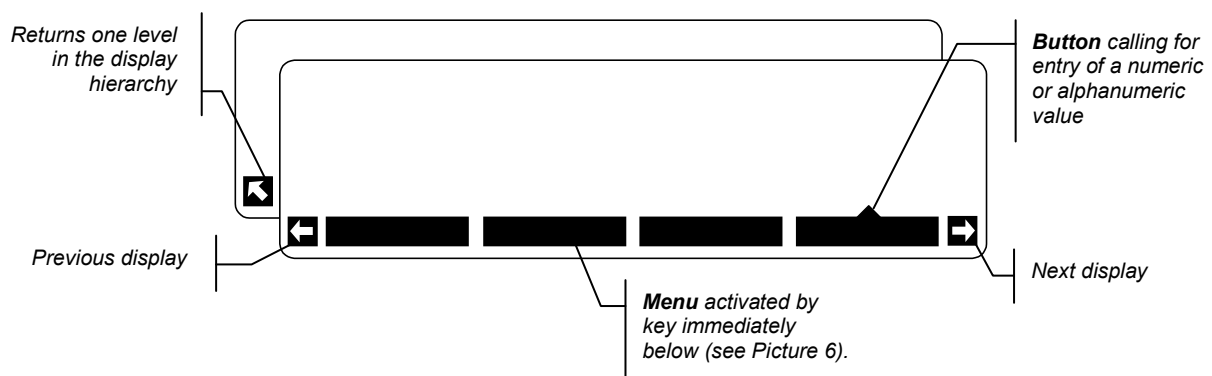


Figure 1: General operation of display and menus

On either side of this display, two buttons make it possible to travel up and down the hierarchy of menus (press the navigation keys – see Picture 6 above – corresponding to the **NEXT SCREEN** and **PREVIOUS SCREEN** buttons – see Figure 1 above – to activate them). In the lower part of the display, there are four keys by means of which the menus displayed on the display can be activated.

6.1.2. Backlight setting

The LCD screen backlight is set by a combination of the **ENTER** key and the high **DIRECTION KEY** for less contrast and low **DIRECTION KEY** for more contrast (refer to the next section).



Note: The intensity of the backlight can change according to the ambient temperature.

6.2. The control keys

Three keys take up the lower left-hand side of the front panel, namely:



STOP/TEST: To stop a test or any other operation
If the LED is lit up, this means that a test is in progress.



RESET : To cancel and go up through the display/menu hierarchy



Interrupts the audible alarm signal. (**ALARM STOP**)
If the LED is lit up, this means that a problem has arisen. Pressing on this button will give the error message content.

The rest of the front panel is occupied by a numeric keypad equipped with a **CANCEL KEY** and an **ENTER** key:

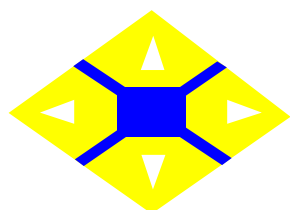


ENTER key: validate an input of variables.



To CANCEL characters.

Finally, in the lower left-hand section, there are four direction keys used to move around a text field and select characters to enter variables (e.g. name of sample).



DIRECTION keys.

6.3. The Welcome display

When the analyzer is switched on, the welcome screen is displayed. If it does not, first check the backlight settings (see section 6.1.2 on the previous page).

This screen provides information about ISL and two menus offering the choice of language (when this choice has not been set as one of the Analyzer's internal parameters).

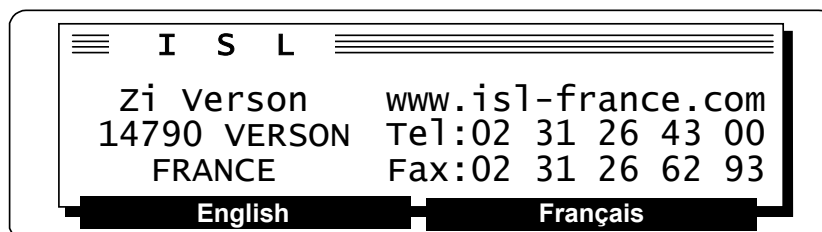


Figure 2: Welcome display.

This display remains active until the key corresponding to the language of your choice is pressed. Doing this activates the display 1 of the **FZP Pt Run/Start** menu (see Diagram 1 page 2-27).

- Press the key corresponding to the language of your choice to continue.

Note: You can disable the language choice as part of the startup parameters, refer to the Part 3 section 7.1 page 3-51. If the choice is locked, press any key on the front panel.



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Part 2 Use of the FZP 5G2s with pre- installed products

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1.Introduction

This part will be concerned with all aspects relating to the test for determining the freezing point of hydrocarbons using pre-installed products. They are stored in a memory that can be saved or updated very easily (e.g. when a standard is changed) by downloading from a PC via the SERVICE port (refer to the chapter 0 page 4-66).

2.The first test

In this chapter we will deal with a Freezing point test carried out with the FZP 5G2s, stage by stage. We will, however, only describe the menus that are strictly necessary for the successful operation of the test, the main screen level being explained in Part 3. We will further assume that the operator has taken due note of the care that needs to be taken with the substances tested.

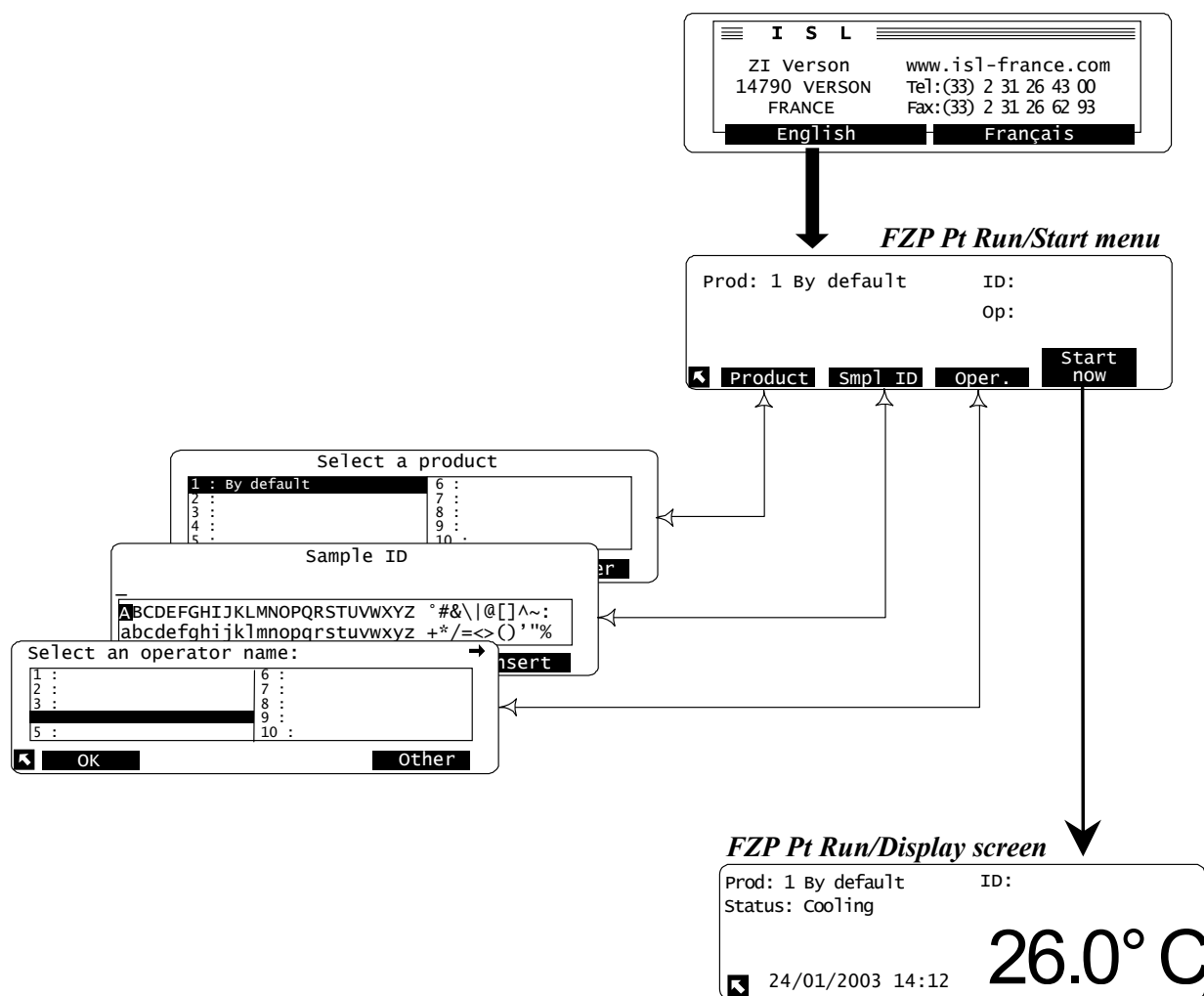


Diagram 1: Starting a test.

When the device is switched on, the welcome display (see Figure 2 page 1-23) appears. After the language has been selected (or any key pressed if the language has been locked), the **FZP Pt Run/Start** menu display directly appears thus (refer to the Diagram 1 on the previous page):

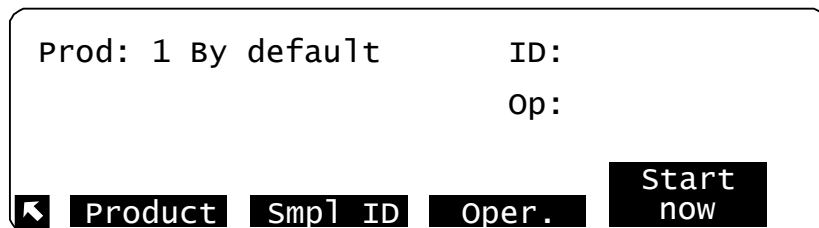


Figure 3: Screen of the FZP pt. Run/Start menu



There are two points to be made in this respect :

- After switching on the device, the display of the **FZP pt Run/Start** menu above is obtained after the language has been chosen or by pressing any key on the front panel if the language has been locked.
- This screen is not placed hierarchically after the Welcome display. The arrow on the left bottom of the display, the **PREVIOUS DISPLAY** key (see in section 6.1.1 page 1-22), allows backing up on the main screens level (refer to the Part 3 chapter 2 - The main level screens page 3-35).

These measures have been taken to accelerate access to test-related menus.

The **FZP Pt Run/Start** menu display contains the following information:

- Prod: type of product tested (selected by default at switching on)
- ID: identifying name of the sample
- Op: identifying name of the operator

The **FZP Pt Run/Start** menu display contains the following menus and buttons:

- ↳ **Product** : selection of the product type (and its associated run parameters) used to carry out the test
- ↳ **Smpl ID**: sample identifying name entry button
- ↳ **Oper.** : operator name entry button.
- ↳ **Start now** : Start test button.



Note: All these information are optional to start a Freezing point determination test.

Actually if the product selected by default at switching on is suitable for the specimen to be tested, just start the test by pressing the **Start now** button.

2.1. Selection of a pre-installed product

The **Product** menu of the FZP Pt Run/Start display (see Figure 3 on the previous page) enables the factory pre-installed product list to be displayed in order to select a product other than one selected by default at switching on. Different parameters (defined in the **Run Environment** menu, refer to the Part 3 chapter 5 page 3-43) are associated with each of these products. Activating the **Product** menu displays the screen below:

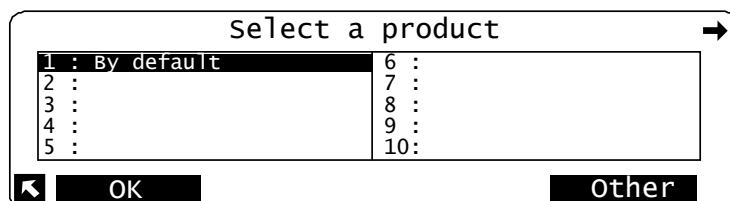


Figure 4: Product list display of the FZP pt. Run/Start menu

The FZP 5G2s Analyzer can store up to 40 prestored products; the black arrow in the top right-hand corner of the screen indicates the presence of more lists following on. Use the **RIGHT** and **LEFT DIRECTION KEYS** to move from table to table and scroll through the different pages of products.

To select a prestored product, enable the corresponding field with the **DIRECTION KEYS**. When the desired field has been enabled, press the **OK** key to confirm the selection and return automatically to the **FZP Pt Run/Start** menu.

The **Other** menu lets you create a new product to configure a test without using a prestored product but this new product will not be stored in the list of prestored products (this operation requires level 1, Laboratory level, authorized access). This method is therefore recommended for one-off tests only.

Press the **OTHER** key. The screen 1 of the product **Environment** menu is displayed allowing configuring all parameters of a product. Refer to the Part 3 chapter 5 - Test setting and printing: the "Run Environment" menu page 3-43 for the procedure to follow.

2.2. Characterization of the test

2.2.1. Sample identifying

Press the **Sampl ID** key of the **FZP Pt Run/Start** menu (see Figure 3 page 2-28) to complete the information regarding the sample identifying, the "Sample ID" entry screen is displayed. Enter the sample identification name according to the procedure explained in the section below (see section 2.2.3 on the next page).

After confirming the sample ID by pressing the **OK** key, the initial screen returns automatically to the **FZP Pt Run/Start** menu.

2.2.2. Operator ID

Press the **Operator** key of the **FZP Pt Run/Start** menu (see Figure 3 page 2-28) to complete the information regarding the operator identifying. A list of operator names is displayed:

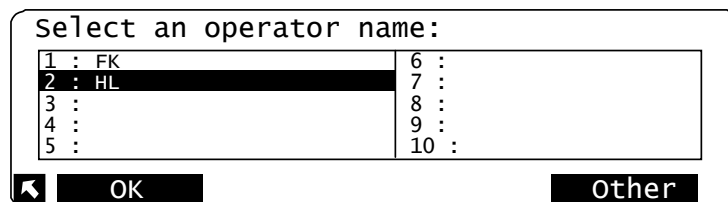


Figure 5: List of operator names

The FZP 5G2s can store up to 10 operator names. If the desired name has already been saved, enable the corresponding field with the **DIRECTION KEYS** on the front panel, and then press **OK**, the initial screen returns automatically to the **FZP Pt Run/Start** menu.

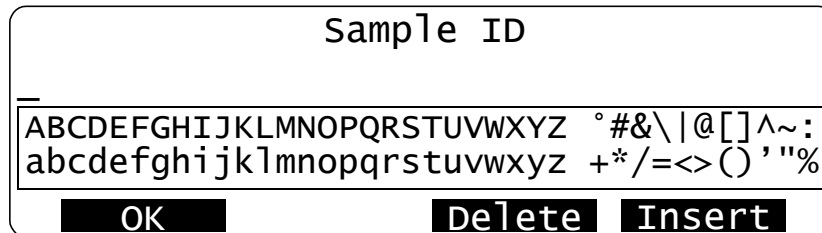
The **Other** menu lets you identify a new operator, but not record the new identifying name in the list of prestored names (this operation requires level 1 (Laboratory level) authorized access). This method is therefore recommended for one-off tests only. To create a new name and save it to memory, see Part 3 chapter 5 - Test setting and printing: the "Run Environment" menu page 3-43.

Select a name or select an empty field then press the **OTHER** key to display the "Operator name" text entry screen. Enter the operator name according to the procedure described below (see section 2.2.3 on the next page). After confirming the operator ID by pressing the **OK** key, the initial screen returns automatically to the **FZP Pt Run/Start** menu.

2.2.3. Text entry display

2.2.3.1. Text entry

On this screen, the sample-identifying name for example can be entered. Values for the fields offered can be entered by means of the corresponding buttons. Thus, to enter the sample-identifying name, the **Smpl ID** button of the FZP Pt Run/Start display is pressed. The following display then appears:



The image shows a text entry screen with a title bar labeled "sample ID". Below the title bar is a large rectangular area containing two rows of characters. The first row contains uppercase letters A-Z, followed by a space, and then special characters: °, #, &, \, |, @, [,], ^, ~, :, and . The second row contains lowercase letters a-z, followed by a space, and then special characters: +, *, /, =, <, >, (,), ', ", and %. Below this character table are three buttons: "OK", "Delete", and "Insert".

Figure 6: Text entry screen. The field concerned is the sample-identifying name (sample ID).

This display is typical of text entry displays. It is found at all points and is essentially made up of two parts:

- ♦ A **variable** part, on the upper part of the display, which is the name of the field.
- ♦ A **recurrent** part (whatever the field is) consisting of an alphabetic table (from which the characters to be entered are selected) and three buttons: **OK**, **DELETE** and **INSERT**.

The characters are entered in the following way:

1. On the entry display, a black rectangle flashes on the first letter of the table ("A"). To select a letter, use the direction keys on the front panel. Press the key as often as necessary (or keep the finger pressed on it) to indicate the direction of the character sought.
2. When the flashing rectangle is positioned on the character sought, press the **ENTER** key on the **NUMERIC KEYPAD**. If the character is incorrect, cancel it with the **CANCEL** key.
3. If there is a mistake in the string of characters entered, use the **DIRECTION KEYS** and the **Insert** and **Delete** buttons to remedy it.
4. Finally, validate with the **OK** button of the text entry display.
Proceed in similar fashion for the operator name.



Note: To speed up the test run procedure, the text entry screen has a semi-automatic input feature.

After validating the initial display returns automatically (in this case, to the **FZP Pt Run/Start** menu). The same is true at each entry of text variables by means of the text entry display.

2.2.3.2. Assisted edition


To speed up test starting the text entry screen enjoys a semi-automatic input feature: the latest text inputs are stored in memory so that the operator only needs to enter the first two or three characters for the whole to be displayed.

If the function **Auto Edition** is activated, the Analyzer proposes a suite when characters are entered according to prior enters. This function is intended for accelerate test initiating and it can be configured or deactivated (refer to the section 7.1- Power on parameters: the "General" menu page 3-51).


2.3. Initiating the test

2.3.1. Procedure

After having prepared the analyzer, carry out the following operations to initiate a freezing point test:

 **Do not forget to put the beaker under the drain tube in order to recover the used sample (see Picture 5 page 1-21).**

1. Withdraw, by means of the syringe provided, a 10-ml volume of the sample (for a justification of this choice of volume, refer to the chapter 5 - Description of the device page 1-21).
2. Insert syringe gently into the orifice designed for this purpose on the test bench (see Picture 4 on page 1-21) and inject the contents of the syringe.

 **After the sample is injected, it is essential that the syringe remains inserted in the sample injection orifice.**

3. Activate the **Start now** menu of the **FZP Pt Run/Start** menu (see Figure 3 page 2-28) : if all the stages have been carried out correctly, the test starts and the following display will appear:



Figure 7: **Start now** display (in cooling phase)

The display contains the following information:

- Prod: product type selected to carry out the test
- ID: identifying name of sample
- Status: indicates the operation in progress; in the case of the above figure, this is the cooling phase for the sample. The indication → **Freeze** in the status field characterizes the hydrocarbon freezing point search phase.
- The current date and time.
- The current sample temperature given by the sensor (in bold characters).

2.3.2. Test in progress

The FZP 5G2s will cool the sample down until hydrocarbon crystals appear. When the optical detection cell detects the sample is dark the cooling phase stops. The FZP 5G2s then starts to search for crystals disappearance point by heating the sample at a low rate.

When the point at which the crystals disappear has been found the message "FREEZE Pt" appears and the result is displayed.

Then the final phase of sample reheating starts: the analyzer begins a faster warming up of the sample to reach the ambient temperature, thus allowing a new test to be begun rapidly.

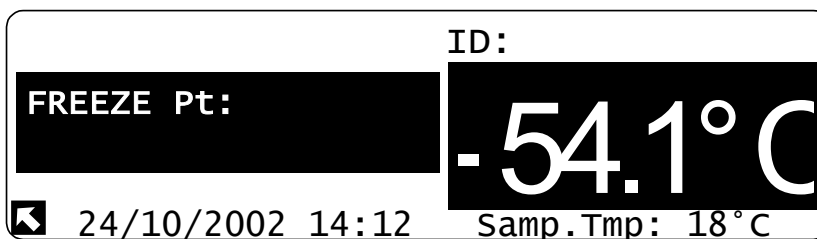



Figure 8: **End of test** display (in reheating phase)

 **To achieve a greater reliability in the result, the FZP 5G2s continues for a moment to heat the sample at a low rate after finding the point at which the crystals disappear to satisfy itself that the point of disappearance of the crystals is indeed that found previously. This being so, the sample temperature display (Figure 7) "jumps" to the End of test display (Figure 8).**

The rapid warming up phase is indicated by the flashing of the green LED of the **Stop/Test** key (please refer to the section 6.2 page 1-23).

The result is displayed in reverse video. It is stored in the memory (refer to the chapter 3 - Results displaying and printing: The "Results" menu page 3-37 for the description of information supplied).

2.3.3. End of test

The end of the test will be indicated by a warning alarm when the sample temperature has attained about 12°C:

1. The message "**End of test: Freeze point detected**" indicates the Freeze point of the sample tested is obtained. The result is displayed and stored in the analyzer memory device.
2. The message "**End of test: Freeze Pt not detected**" indicates the point at which the crystals disappear has not been found. The FZP does not store any temperature (the result display will not be displayed) but the result is nevertheless registered.
3. The message "**End of test: Crystall. not detected**" indicates that no crystallization had been detected (Cd, see Diagram 4 page 3-39) before the lower temperature set in the product run parameters is reached. Then the Analyzer can not search the point of crystals disappearance but the result is nevertheless registered.

Press the **ALARM STOP** key on the keypad to display the alarm message and to acquit it. These messages will be stored with the results in the memory device.

In few rare cases the FZP 5G2s can start a confirmation cycle so as to improve the result accuracy. The indication "Second cycle" then appears on the Start now display replacing the sample temperature field (see Figure 7 page 2-31). Then the test can last up to 30 min. This will be signaled by a message on the result curve and by a binary message on the result ticket (refer to the section 3.2 page 3-40).

The personalization of the parameters, together with the display and printing out of test results, will be dealt with in the second part of this manual.

2.4. Cleaning the detection cell

Cell cleaning is normally done with the next sample and a chase-n-flush technique. It will be recalled, however, that the sample volume has been so calculated that the cell is cleaned by it. But the detection cell will have to be cleaned from time to time or after running dirty samples or heavily contaminated jet fuel samples. For this, inject 10 ml of heptane (do not forget to put a beaker at the appended tube end).



Caution! Do not use acetone.



All solvents are prohibited (they may cause deterioration of the cell). Use only heptane.

Note: If the cell is accidentally cleaned with a solvent, this will be rapidly rinsed with an injection from 10 to 20 ml of heptane or kerosene.

Part 3 Advanced use of the FZP 5G2s

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1.Introduction

This part deals with the advanced use of the FZP 5G2s, i.e. the setting of the device according to the needs of the user. As previously indicated, this presupposes that the user is familiar with the techniques of plugging tests. The FZP 5G2s settings are accessible from the main screens level (see the Diagram 2 below).

2.The main level screens

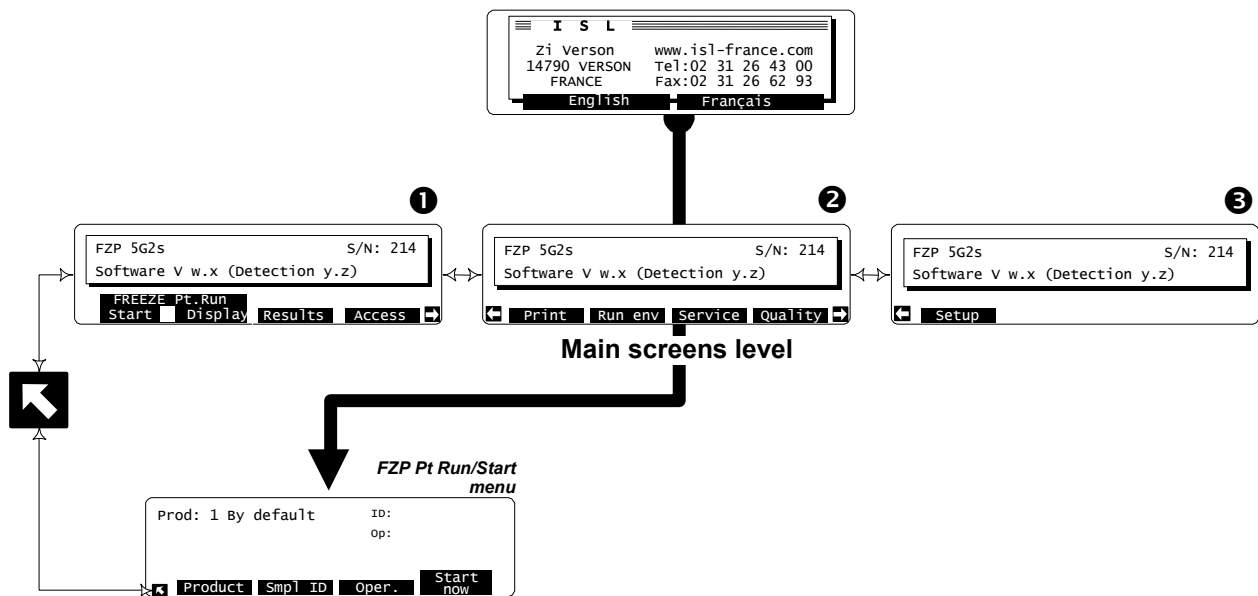


Diagram 2: Access to the main display level.

The main level display is the highest hierarchically speaking. It is not directly accessible when the unit is switched on.

To access it, after switching on the unit and selecting a language (or pressing any key if the language has been locked), it is necessary to go up one display level (press the **RETURN ONE LEVEL UP** button, see in Part 1 section 6.1.1 page 1-22).

The Diagram 2 above shows how access to this level operates (refer to the Appendix C page 85 for a complete view of menus functionality).

- ◆ If the user has operator level access (access 0), a simple menu is available (❶):
 - A test can be started and followed.
 - A result and result details can be displayed and printed.
- ◆ Users with laboratory (access 1) or service (access 2) level access have a complete menu (❶+❷+❸).

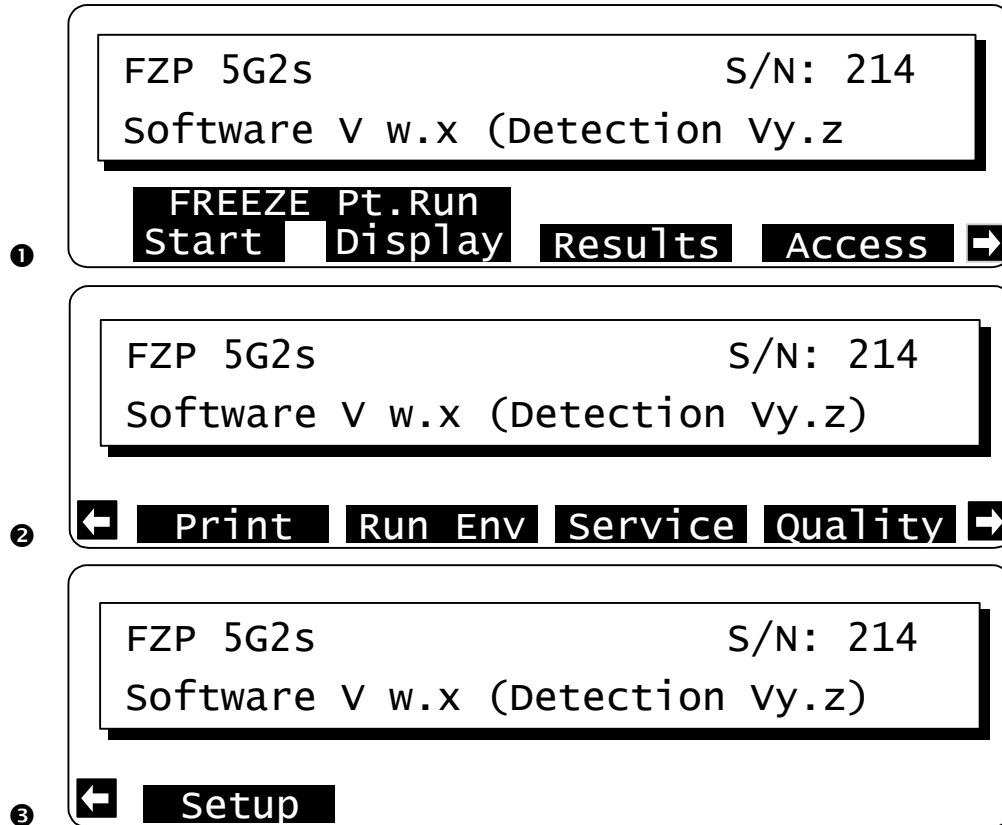


Figure 9: The three displays of the main menu.

The main display level includes the following components, respectively from top to bottom and from left to right:

- The name of the device.
- The serial number of the device.
- The version of the control software and the version of the detection cell.

The menus of the main level are **FZP Pt. Run/Start**, **FZP Pt. Run/Display**, **Results**, **Access**, **Print**, **Run Environment**, **Service**, **Quality** and **Setup**. These menus will be dealt with in detail in the paragraphs following.

It should be noted, however, that the **FZP Pt Run (Start and Display)** menu was covered almost in its entirety in Part 2.

In the following we shall assume that the access level is level 1 (Laboratory). This level allows access to the settings associated with tests, making it possible to modify them and thus design personalized products that respond to specific needs. The access levels will be dealt with through the **Setup** menu.

3.Results displaying and printing: The "Results" menu

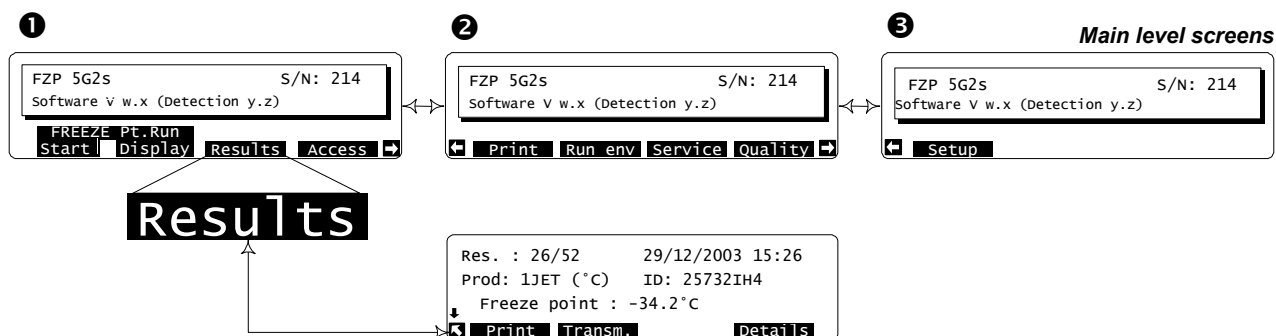


Diagram 3: The Results menu

Test results are stored in a dedicated memory. The FZP 5G2s can store between 45 and 50 test results. When the memory is full, the FZP 5G2s automatically overwrites the first results recorded.

Results can be displayed, printed and sent to a PC by the RS232C link (refer to the Part 1 section 4.3.3 - FZP 5G2s / PC link page 1-19).

3.1. Result displaying from result memory

From the **Freeze Pt Run/Start** menu the user must go up one level in the display hierarchy: press the arrow key on the left bottom of the display, the PREVIOUS DISPLAY key (see in Part 1 section 6.1.1 page 1-22) to return on the main screens level (see Diagram 2) then:

- 1.Press the button for the **Results** menu of the main level screen 1; this calls up the display allowing access to all the results saved, which are shown as the display below (Figure 10).

- 2.To access the desired result, press the DIRECTION KEYS as many times as needed.

Note: The black arrow at the left bottom of the screen indicates the presence of a registered result after the result displayed.

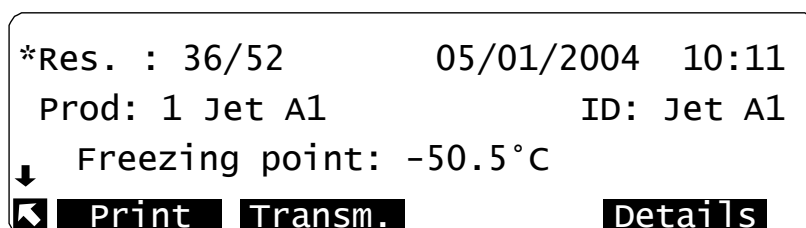


Figure 10: Display of the Results menu.

This screen contains the following indications:

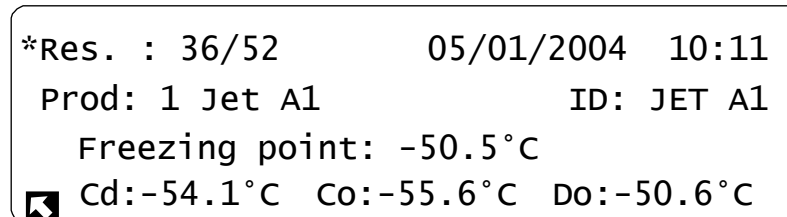
- Res. : __/__: Number of the result displayed over the number of results stored in memory
 - * : an asterisk appears in front of the result number if the test was run although a default had been notified or if a default occurred during the test. These defaults are not displayed but they are printed out with the result in the form of a binary message (refer to the next section).
- Date and time of the end of the test.
- Prod : name of the product profile use to test the sample
- ID : Identifying name of the sample
- Freezing point: __: Temperature of the point at which crystals in the sample disappear and the cause for test termination.
 - 2 other possible causes for termination can be displayed:
 - ↳Freezing point not detected
 - ↳Crystal. Not detected till __

The different types of test have been dealt in the section 2.3.3 - End of test page 2-32.

The end of a test triggers a warning alarm peculiar to each type of end of test. Refer to the section 6.5 page 3-48 for more precise details about these alarm messages.

The result display contains the following **menus** and **button**:

- ✚ **Print**: To print the result selected (displayed) and to access to the printer setup menu – see next section
- ✚ **Transm.:** Press the **Transmit** button to validate the result displayed and send it through the serial RS 232C link. Parameters linked to this communication mode have to be set (refer to the section 7.6.1 page 3-53). Messages are transmitted in the form of character string in ASCII code (refer to the Appendix B for the meaning of the content of the messages).
- ✚ **Details**: To display the result detail display:



```

*Res. : 36/52          05/01/2004  10:11
Prod: 1 Jet A1          ID: JET A1
Freezing point: -50.5°C
Cd:-54.1°C  Co:-55.6°C  Do:-50.6°C
  
```

Figure 11: The Result Details display

This screen contains in the upper part the same indications as the display of the **Results** menu and in the lower part, 3 additional values that characterize the tested fuels' cooling behavior: **Cd**, **Co**, and **Do** resulting from the two signals supplied by the optical detection cell (see the following diagrams):

- the **Detection signal** allowing to determine crystals presence
- the **Opacity signal** allowing to indicate the sample opacity

Therefore, crystal appearance and disappearance in fuel sample causes typically two peaks in the FZP 5G2s' **Detection Signal**; its amplitude and width depend on size and shape of crystals as well as freezing rate of a particular jet fuel. Neat jet fuels typically show narrow, sharp curves (see Diagram 4 below), while contaminated fuels' curve shape can vary widely as their inherent multi-stage crystallization process generates a complex response curve formation (see Diagram 5 below).

Like Detection Signal, the form and amplitude of the **Opacity Signal** curve depend on crystal size and shape as well as the freezing rate of a particular jet fuel. But generally speaking, crystals appearance and disappearance are frank. Freezing point is the temperature at which last crystals disappear during the reheating stage, this value is determined by the detection signal.

➤ **Cd** is the temperature at which the first crystal appears. This value is determined by the detection signal.

➤ **Co** is the temperature at which the sample becomes dark.

◆ In **Neat Fuels**, crystals apparition is very frank and the sample becomes nearly immediately dark. **Cd** is almost the same as **Co**.

◆ In **Contaminated Samples**, **Cd** is detected much earlier as typically crystals of contaminant appear first. At low levels of contamination, concentration of such crystals is not sufficient for generation enough light for reliable **Co** determination. **Co** will be detected when crystalline structure starts to be formed which correspond to beginning of aviation fuel crystallization (the sample becomes dark).

➤ **Do** is the temperature at which dark almost completely disappears (detected by the Opacity signal).

◆ In **Neat Fuels**, **Do** is almost the same as Freezing point.

◆ In **Contaminated Samples**, **Do** responds only when the general mass of crystals has disappeared. Due to still retained crystals of contaminant, the real Freezing point, according to method, is significantly warmer than the less sensitive **Do** reading. Nevertheless, at low levels of contamination, **Do** value can give obvious idea what might be the Freezing point of aviation fuel if it were not contaminated.

Printout of this additional information on the result ticket or on the result curve is disabled in factory-delivered FZP 5G2s units; however, an experienced user can enable these functions in the field (refer to the section 4.2- Printer setup page 3-41).

It's important to note that this additional information (**Cd**, **Co**, **Do**) is exclusive to ISL's FZP 5G2s design and detection technique and should be interpreted and applied by users at their own discretion.

These values are derived from a physical property of tested fuel and are therefore repeatable and reproducible; however, repeatability and reproducibility have not been defined. ISL does not warranty correlation of these additional values to any known test method. ISL, however, does guarantee reliable Freezing point value from the FZP 5G2s.

ISL FZP 5G2s S/N : 214 V5.4 12/01/2004
 Date : 05/01/2004 10 :11 Op : HC
 Product : 1 Jet A1 ID : Jet A1

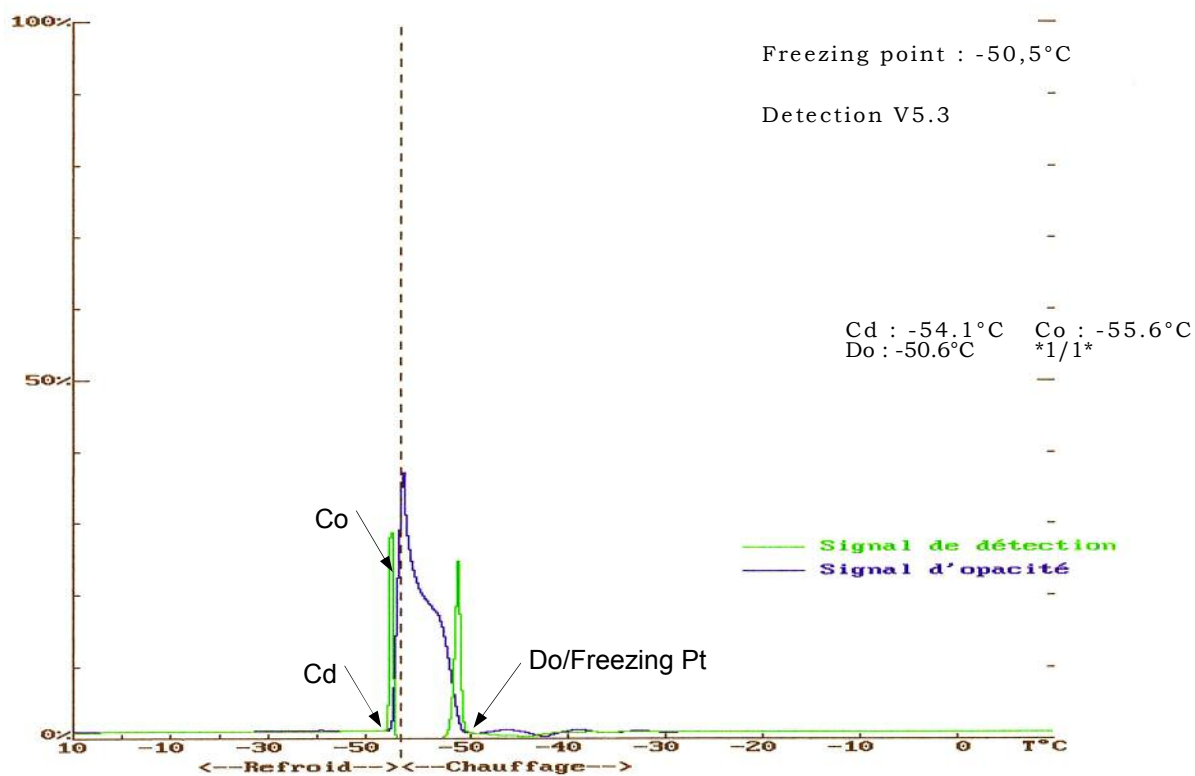


Diagram 4: Result curve of a neat sample

ISL FZP 5G2s S/N : 214 V5.4 12/01/2004
 Date : 05/01/2003 10 :37 Op : HC
 Product : 1 Jet A1 ID : +2% Go

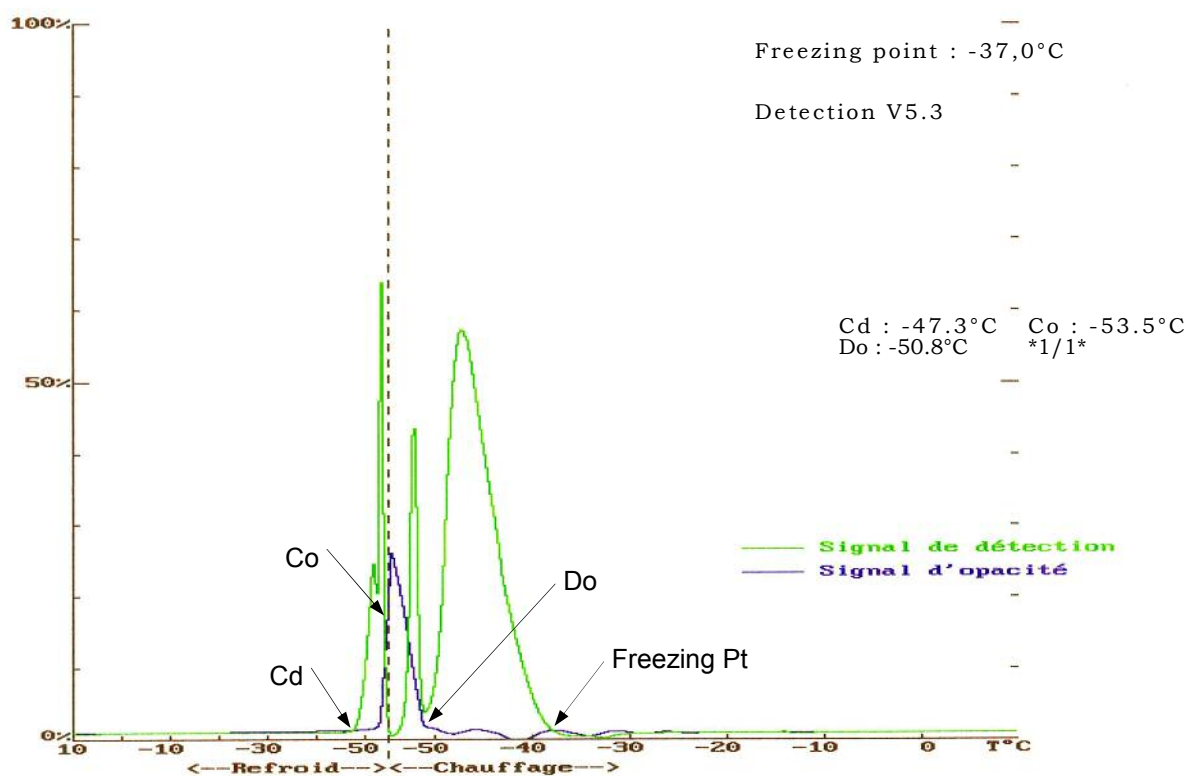


Diagram 5: Result curve of a contaminated sample

Information printed with the result curve:

In the top left:

- The analyzer type, its serial number, the N° of the software version installed, the date of the current day
- The date at which the test has been performed, the hour of the test end and the name of the operator
- The product name and the sample identifying name

In the top right:

- The result message "Freezing point: - _ _ . _ _": temperature at which the crystals disappear in the sample
- If this result is rounded (at 0,5°C/°F), the indication "Rounded" appears under the result (parameter of the product, refer to the section 5.1 page 3-44)

In the middle right:

- The value of parameters Cd, Co and Do
- The indication *1/1*: Number of cooling cycle performed / N° of the cycle having allowed to detect the Freezing point (up to 2 cycles).

3.2. Result printing

The FZP 5G2s can print results in different ways: with or without details values, with or without product parameters, in ticket or in curve form. The data printed depend on the analyzer setup and, as required, the results of the last test or of any test (refer to Appendix A page 71 for printing type examples).

It is also possible to print test results automatically after the end of the test (refer to the section 4.2- Printer setup page 3-41). To be able to do this, make sure that the unit is linked up to a printer compatible with the analyzer (using PCL-3 or ESP/P language) and set "on line".

From the display of the **Results** menu (Figure 10 page 3-37) press the **Print** key, the following display appears:

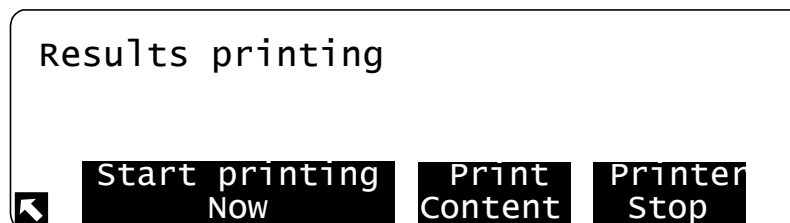


Figure 12: Print menu display (of the Results menu)

This display contains the following **menus** and **buttons**:

- Start printing Now**: To start the printing of the selected result according to the printer setup.
- Print content**: To define the data to be printed and to set the printer.
Pressing the **Print Content** button calls up the **Setup** menu of the **Print** menu. Refer to the section 4.2 - Printer setup page 3-41. Modify the printer setup requires having level 1 access authorization.
- Printer Stop**: To stop the current printing.

Information like warnings occurred during a test just appears at result ticket printing. These failures, indicated at result displaying by an asterisk in front of the result number (see the Figure 11 page 3-38) are identified by a binary message printed with the result at the bottom of the ticket or on the curve in the top left following the information:

Warning during test:

Displaying of bits in the following order: bit 7, 6, 5, 4, 3, 2, 1, and 0

Bit	Significance
0	Bit 0 = 1: Adjustment of the temperature measurement circuit have to be done
1	Not used
2	Not used
3	Not used
4	4 = 1: Test performed with two cooling cycles
5	Not used
6	Not used
7	Not used

Note: When only the condition "2 cooling cycles" occurs, the warning binary message is not indicated on the curve because the message: "As dual cooling cycle was done.

Opacity signal is not available"

is clearly printed in the bottom right of the curve.

4. Printing and printer setup: The “Print” menu

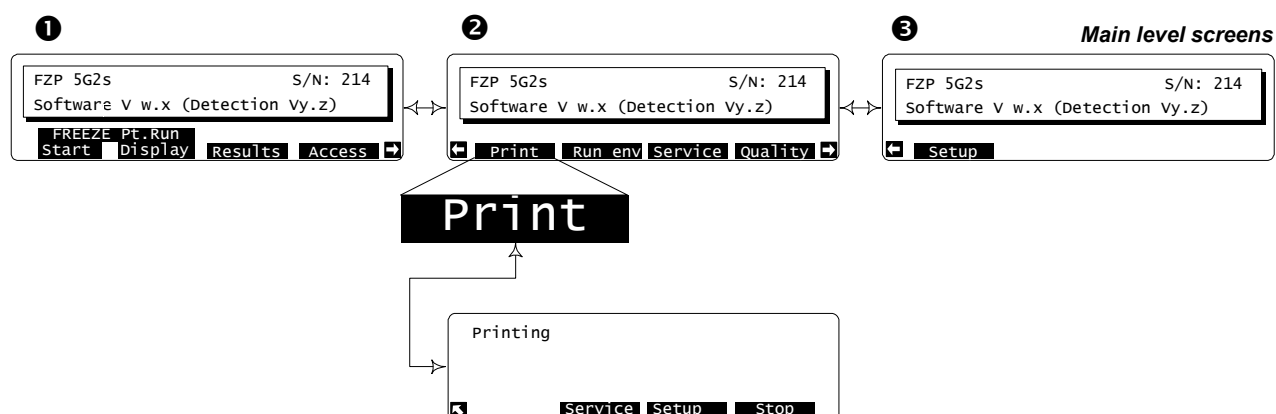


Diagram 6: The Print menu

To access to the printing menu, activate the main level **Print** menu; the following display will appear (as the Diagram 6 above describes it):



Figure 13: Print menu screen

The **Print** menu screen contains the following menus and commands:

- **Service** : To print the values of measurements and internal parameters (level 2 access required)
- **Setup** : To setup printing parameters
- **Stop** : To stop the current printing job

4.1. Service printing

The **Service** menu of the **Print** menu is designed for Analyzer maintenance and requires Level 2 access. It contains submenus from which internal Analyzer measurements can be printed, either instantly or during a full test run (monitoring regulation) or also the internal Analyzer parameters. Refer to the Part 4 chapter 3 - The “Service” menu of the main printing menu page 4-64.

4.2. Printer setup

The printer is configured by means of the **Setup** button of the **Printer** menu (see Diagram 6 above). Configuration can also be carried out by means of the **Printer** menu of the **Setup** menu (screen 3 of the main screens level). The following screens appear:

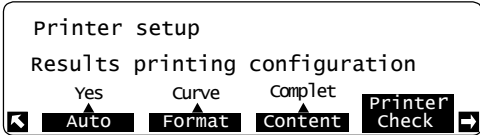
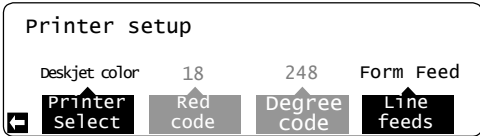
Display	Meaning of different menus	Field values
(Print menu of the Setup menu).	(Going from left to right and from top to bottom).	
Next display		
 <p>Printer setup Results printing configuration Yes Curve Comp1et ◀ Auto Format Content Printer Check ▶</p>	<p>Auto : automatic printing at the end of test</p> <p>Format : printing format</p> <p>Content : printing content</p> <p>Printer check : starting of the printer test</p>	<p>Yes/No</p> <p>Curve/Ticket</p> <p>Detailed/Light</p>
Setup menu display 1		
When the content is "detailed", the detailed values (Cd, Co and Do, refer to the section 3.1 page 3-37) are printed with the result (ticket or curve) and parameters of the product profile used to carry out the test are printed on the result ticket.		
 <p>Printer setup deskjet color 18 248 Form Feed ◀ Printer Select Red code Degree code Line feeds ▶</p>	<p>Printer select : printer selection compatible with the Analyzer (using PCL3 or ESC/P language)</p> <p>Red code : code for printing in red (see printer doc.).</p> <p>Degree code : ASCII code designating "degree" code (see printer doc.).</p> <p>Line feeds : number of line feeds after printing.</p>	<p>Epson compatible ESC/P; 40 columns; DeskJet Black/White; DeskJet Color</p> <p>See printer doc.</p> <p>See printer doc.</p> <p>0 to 5</p>
Setup menu display 2		
4 printer types can be selected:		
<p>E.g. :</p> <p>Configuration of a 40 column CITIZEN® printer</p> <p>40 18 91 2</p> <p>Configuration of an ESC/P 80 column printer</p> <p>ESC/P 248 2</p> <p>Configuration of a DeskJet® Color printer:</p> <p>DeskJet 18 248 Form Feed</p> <p>Color</p>		
For the exact configuration, however, reference must be made to the manual supplied by the printer manufacturer.		

Table 1: Print / Setup menu display

5. Test setting and printing: the “Run Environment” menu

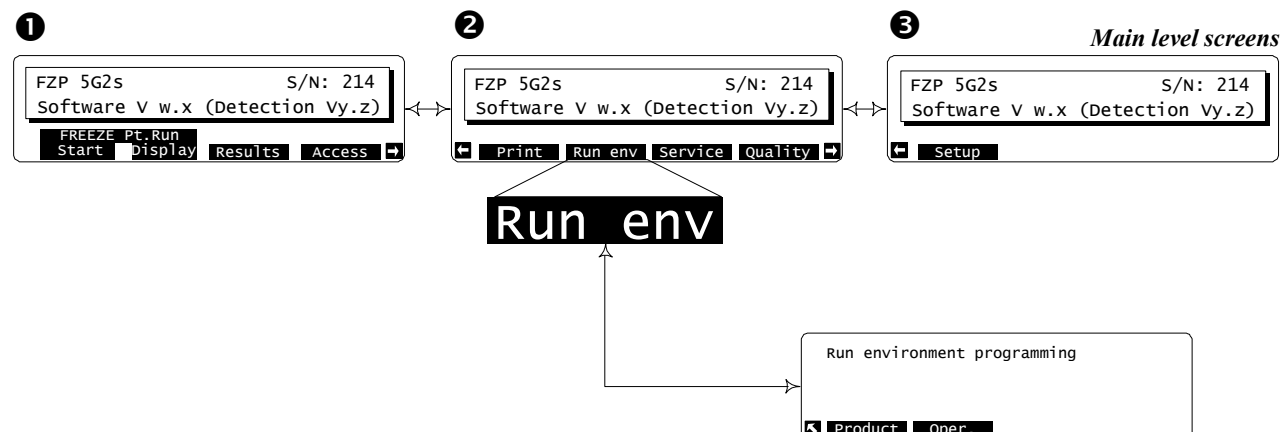


Diagram 7: The Run Environment menu

All run parameters of a product profile are visible but a product can only be created or modified if one has the level 1 access authorization (Laboratory).

Access to the run parameters of a product profile as follows:

1. Enable the **Run Environment** menu on screen 2 of the main level screens (see Diagram 7 above). The following screen is displayed:

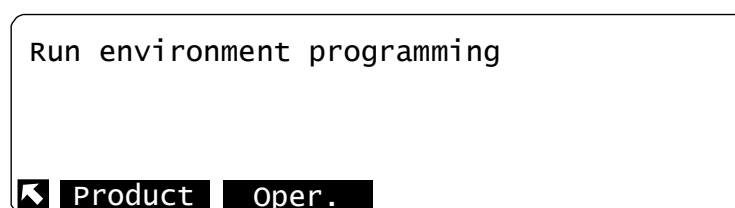


Figure 14: Run Environment menu screen

The **Run Environment** menu screen contains the following menus:

- ↳ **Product** : to display the prestored products list to print, modify or create of a new product profile
- ↳ **Oper.** : to display the operator names list to print, modify or create a new operator ID.

Values in the fields of the **Run Environ.** menu screen cannot be changed without level 1 access (password), Laboratory.

5.1. Run parameters of a product

Press the **Product** key in the **Run Environment** menu to display the list of prestored products, the following screen is displayed:

Figure 15: Product menu screen

The **Product** menu screen contains the following menus:

↳ **Print** : to print run parameters of the product selected

The **Print** menu lets you print out the run parameters for the product selected. Press the **Print** key to start printing immediately. See the printout example in Appendix A section 2 - Product parameter print page appendix 73.

↳ **Details** : to access to the product setup menu (see table below)

The FZP 5G2s Analyzer can store up to 40 prestored products; the black arrow in the top right-hand corner of the screen indicates the presence of more lists following on. Use the **RIGHT** and **LEFT DIRECTION KEYS** to move from table to table and scroll through the different pages of products.

Select a prestored product if you wish to modify its associated run parameters or select an empty field if you wish to create a new product (see in Part 2 section 2.1- Selection of a pre-installed product page 2-29 for precise explanations on how to select a field). Press the **Details** key, screen 1 of the product **Details** menu is displayed as shown in the table below.

Display (Product details menu).	Meaning of different menus (Going from left to right and from top to bottom).	Field values
<p>Product details menu display 1</p>	<p>Current product is N°1</p> <p>Name: product name entry button. String The product name in this case is JET</p> <p>Unit: selection of temperature measurement unit. The temperature is here measured in °C.</p>	
Next display...		
<p>Product details menu display 2</p>	<p>Results Rounded: the results can be rounded to the nearest 0.5°C. YES/NO</p> <p>Stop Temp.: temperature of the end of the cooling phase. Min :-1200°C – 184°F Max :+10°C – 50°F</p>	

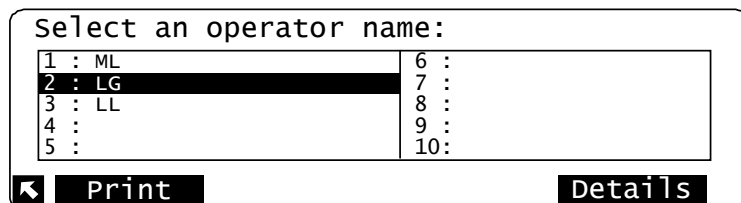
Table 2: **Product details** menu displays



Without the necessary authorizations (passwords), it is not possible to change the field values of the **Product** menu displays. This requires authorization at Access 1 level.

5.2. List of operator names

Press the **Operators** key in the **Run Environment** menu to display the prestored list of operator names (up to 10), the following screen is displayed:



Select an operator name:	
1 : ML	6 :
2 : LG	7 :
3 : LL	8 :
4 :	9 :
5 :	10 :


 **Print** **Details**

Figure 16: List of operator names

The **Product** menu screen contains the following menus:

↳ **Print** : to print the list of operator names

↳ **Details** : to enter a new name or modify the name selected

The **Print** menu lets you print out the complete list of operator names. Press the **Print** key to start printing immediately. See the sample printout in Appendix A section 3 - Operator name list page appendix 73.

Select a prestored operator name if you wish to modify it or select an empty field if you wish to create a new operator name. Press the **Details** key, the « Operator » text entry screen is displayed. Enter the name (see in section 2.2.3 page 2-30 for further details on using the text entry screen) then press **OK** to confirm.

6. Alarm treatment

6.1. Types of alarm

6.1.1. Failure alarms

The failure alarms warn the operator in the event of a malfunction.

Failure alarm detection has at least one of the following consequences:

- A test cannot be started,
- A test in progress is stopped,

These failures set off a continuous audio alarm and the red LED of the **ALARM STOP** key lights up on the keypad (see in section 6.2 page 1-23). Press the **ALARM STOP** key to display the alarm message and acknowledge it or not.

The red LED stays on for as long as the failure persists, even if the alarm has been acknowledged.

6.1.2. Warning alarms

The warning alarms warn the operator of an expected event: "End of test: Freezing point detected" for example.

They are accompanied as for them by a discontinuous audio alarm (the signal modulation width is adjustable; refer to the section 7.3 page 3-51 of this part). The red LED on the **ALARM STOP** key lights up on the keypad. It goes off when the alarm is acknowledged.

6.2. Displaying alarms, stopping the buzzer

When an alarm is triggered, press the **ALARM STOP** key to display the cause. The following screen is displayed:

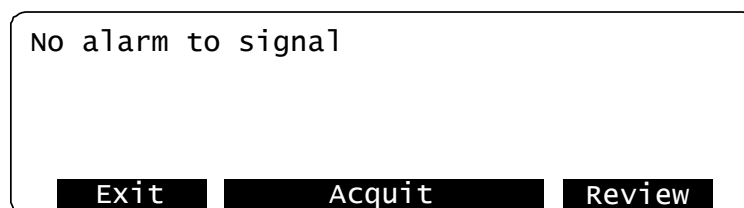


Figure 17: Alarms displaying screen

The alarms screen display contains the following **menus** and **buttons**:

- ↳ **Exit**: to go back to the previous screen without acquitting the alarm.
- ↳ **Acquit**: to acquit the alarm and to go back to the previous screen.
Press the **Acquit** key to stop the buzzer and return to the previous screen. Note that the red LED on the **ALARM STOP** key stays on for as long as the default persists, even if the alarm has been acknowledged.
- ↳ **Review**: to display the alarm historical.

6.3. Alarm processing

Certain alarm cases present a danger. This is why most default settings switch the Analyzer into idle status, thus the cooling unit is cut out and the heating is stopped.

However, this is not to say that this type of analyzer is hazard-free or that if the Analyzer fails to go into idle status the operator and/or Analyzer are not in danger. It is important always to check what is going on whenever an alarm is triggered.



Attention! Generally when the alarm buzzer is triggered, the operator must display the cause and ensure that everything is working correctly.

For example, owing to a faulty component an alarm that normally should place the analyzer in idle mode fails to do so. In that case, the operator must intervene by switching off the Analyzer.

6.4. Failure alarms

6.4.1. Memory failure

When the analyzer is switched on, the microprocessor checks the content of the different memories. If there is an error it will be detected by calculation and comparison with the checksum.

6.4.1.1. "Software memory (PROM)" failure

If this failure is reported, switch the analyzer off then on again. If the failure persists, contact the ISL Customer Service.

6.4.1.2. "Data memory (Ram)" failure

If this failure is reported, switch the analyzer off then on again. If the failure persists, contact the ISL Customer Service.

6.4.1.3. "Safe memory (NVM)" failure

The battery for backing up the non-volatile back-up memory (NVRAM) has a service life of 7 to 8 years. This alarm may therefore be due to a faulty battery.

The content of the saved RAM memory where the Analyzer parameters are stored is checked by the microprocessor. If there is an error, the Analyzer goes automatically into « download » mode so that the contents of the RAM memory saved can be restored by loading a backup file from a PC.

For this purpose, a diskette containing the internal parameter factory settings (necessary if memory has not been recently uploaded) and a PC up/download program are shipped with the standard version of the Analyzer. Refer to the section 4.4 - File download command: the "ISL UDS" menu page 4-66 on how to load the Analyzer parameters.



Note: So as to have an up-to-date copy of the Analyzer's internal parameters always to hand, it is advised to upload the internal parameters to the PC during routine maintenance operations.

Use a new file name each time this operation is performed. Do not use the internal parameter file name on the original diskette supplied with the Analyzer.

6.4.2. "Low battery"

The system keeps a permanent check on this failure. If the failure is reported:

- ✚ Do not switch off the analyzer, as this will delete any stored data.
- ✚ Print or upload to a PC file the Analyzer parameters contained in the non-volatile back-up memory (NVRAM):
 - Uploading: refer to the section 4.4 page 4-66 on how to load the back-up memory (internal parameters, setting values, run environments and results).
 - Printing: the run environments (product run parameters, operator names list, see chapter 5 page 3-43) and the internal parameters (refer to the chapter 3 page 4-64).
- ✚ Switch off the Analyzer and call an ISL approved technician to replace the battery (refer to the Service Manual).
- ✚ Download Analyzer internal parameters or enter it (refer to the chapter 3 - The "Service" menu of the main printing menu page 4-64).



Note: Regular uploading of the internal parameters must be programmed as part of the analyzer maintenance procedure. Use a new filename (e.g. with the current date in the name- PIDDDMMYY. NVM). This way the latest version of the internal parameters will be saved to a file.

6.4.3. "Signal conditioning (A/D Cnv)"

This failure is reported upon detection of no dialogue between the CPU and the A/D converter. Switch the analyzer off then on again. If the failure persists, contact the ISL Customer Service.

6.4.4. "Cooling circuit"

The system checks the cooling circuit 5-min after test starting by verifying the cooling rate. The alarm is triggered if:

- 1 min after the test is started the rate is higher than threshold 2 (by default: -3°C/min, programmable from -2 to -5°C/min)

On cooling during opacity search:

- if the rate is higher than threshold 1 (by default: -1°C/min, programmable from -1 to -10°C/min) during a recognition time programmable from 0 to 120 s.

A test currently running is stopped. Alarm is stopped each time a test is run.

6.4.5. “Heating circuit”

The system checks for this failure from the start of the test by verifying the heating rate. The alarm is triggered if it is not sufficient.

The system cuts the heating command and stops a test being run. The alarm is stopped each time a test is run.

6.4.6. “Sample temperature safety”

The system checks for this failure during the entire test. The alarm is triggered if:

- The sample temperature is higher than “threshold +” (by default: 45°C programmable from –120 to +55°C) during the recognition time (programmable from 0 to 120s).
- The sample temperature is lower than “threshold-” (by default: -120°C programmable from –120 to +55°C) during the recognition time (programmable from 0 to 120s).

A test currently running is stopped. Alarm is stopped each time a test is run.

6.4.7. “Cooling unit temperature safety”

This alarm is triggered if the cooling unit is above 48°C. A test currently running is stopped.

In this case it is advised to:

- Turn off the Analyzer
- Clean the ventilation filters
- Turn on the Analyzer

If the problem continues, contact ISL Customer Service.

6.4.8. “Cooling unit stroke control safety”

Contact ISL Customer Service.

6.4.9. “Cooling unit board link safety”

This alarm is triggered if no dialogue is detected with cooling unit control board. A test currently running is stopped.

- Turn off the Analyzer.
- Open the Analyzer and check the electronic boards connection (refer to the section 5.2 page 4-69)
- Turn on the Analyzer

If the problem continues, contact ISL Customer Service.

6.5. Warning alarms

6.5.1. “End of test: Freeze point detected”

The normal Freezing point is obtained. The result is displayed and stored in the memory device.

The indication is displayed at the end of the test, i.e., when the sample has reached the ambient temperature.

The alarm is stopped each time a test is run.

6.5.2. “End of test: Freeze Pt not detected”

Detection temperature range was exceeded (temperature of the end of the cooling phase set in the product profile) without the Freezing point being detected (the opacity temperature has been detected).

The FZP does not store any temperature (the result display will not be displayed, see section 2.3.2 page 2-31) but the result is stored in the memory device. The alarm is triggered at the end of the test, i.e., when the sample has reached the final temperature.

The alarm is stopped each time a test is run.

6.5.3. “End of test: Crystall. not detected”

The message “Crystallization not detected” indicates the sample temperature has exceeded the stop temperature set in the test product and the opacity temperature has not been detected. Then the Analyzer could not search crystals disappearance point.

Check on cooling during opacity search.

The result is stored in the memory device: Stop on stop temperature xx .x° .

The indication appears at the end of the test, i.e., when the sample has reached the final temperature. The alarm is stopped each time a test is run.



6.5.4. Buzzer modulation setup

Alarm displayed during the audio alarm test after modulation setting (refer to the section 7.3- Configuring alarms : the "Alarm" menu page 3-51 of the current part).

6.6. Alarms historical

The FZP 5G2s can register up to 16 alarm messages.
Activate the **Review** menu from the alarm-displaying screen (see Figure 17 page 3-46), the following screens appear:

Displays	Meaning of different menus	Field values
(Review menu of the Alarm displaying screen)	(Going from left to right and from top to bottom).	
<div><div>Faults review</div><div><div>Date</div><div>Time</div><div>Message registered</div></div><div><div>Exit</div><div>Print</div><div>Details</div></div></div>	<div>Faults review : permanent field</div> <div>Exit: To go back to the alarms displaying screen</div> <div>Print: To print the complete alarms review</div> <div>Details: To display the detailed alarm message</div>	
Display 1 of the Review menu		
Press the DETAILS key to access to the detail displaying screen of the alarm selected:		
		Next Display
<div><div>Date:</div><div>Src:</div><div>Def:</div><div>Exit</div></div>	<div>Date: date at which the failure occurs</div> <div>Src: state of the analyzer when the failure occurred (idle, run, diagnostic ...)</div> <div>Def: alarm message displayed</div> <div>Exit to go back to the alarm displaying screen</div>	
Details display the Review menu		

Table 3: Screens of **Review** menu of the alarms displaying screen

7.Configuration: the "Setup" menu

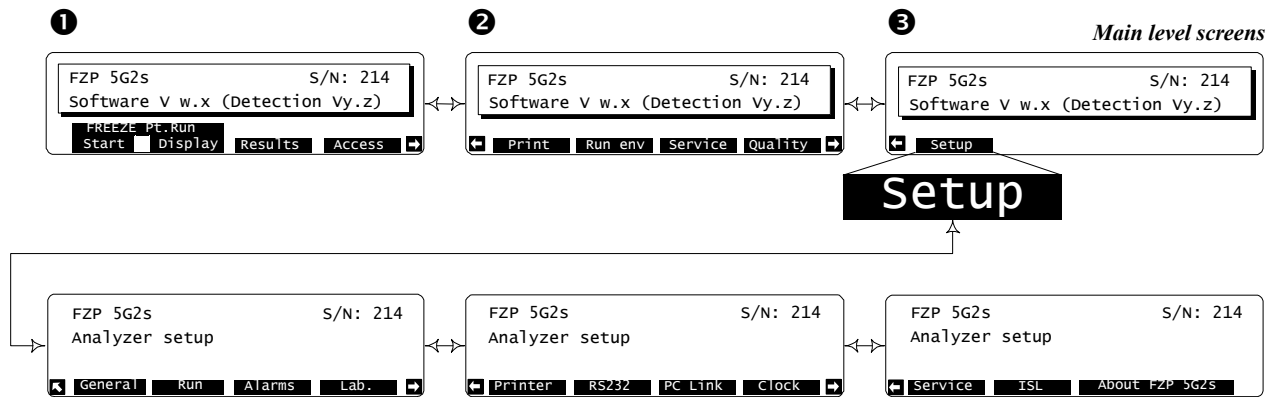


Diagram 8: Setup menu

The FZP 5G2s "working environment" can be completely configured. Thus the testing product in place when the device is switched on can be re-set. The triggering or stopping of an alarm can also be set for when a given error occurs and in other conditions set out below as RS 232C PC link and Alan® local network.

The configuration of the FZP 5G2s is carried out by means of the **Setup** main menu at the main display level (see Diagram 8 above). After the **Setup** menu is activated the following displays appear:

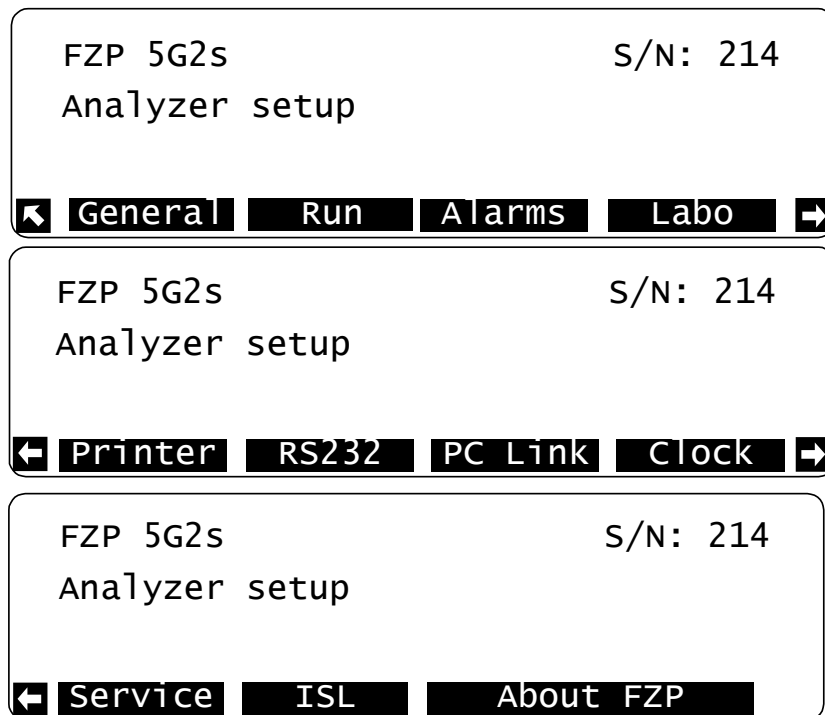


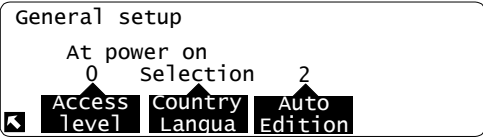
Figure 18: Displays of the Setup menu.

The above displays allow access to the configuration parameters set out below.

7.1. Power on parameters: the "General" menu

The **General** menu allows choosing the access level and the language (if you would like to lock it) in place when the device is switched on.

It also allows configuring (or deactivating) the assisted edition: the FZP 5G2s can propose a suite to the characters entered based on prior enters (refer to the section 2.2.3.2 page 2-30).

Displays (General menu of the Setup menu).	Meaning of different menus (Going from left to right and from top to bottom).	Field values
 <p>General menu display</p>	<p>General setup (permanent field) Power on parameters Access level: choice of default access level when the device is switched on. ☞ : It should be noted that only the current access level or lower access level could be chosen. Country language: choice of language selected by default (locked). "Selection" allows the operator to choose the language. Auto Edition: characters number needed to activate the auto edition (0 inhibits the function).</p>	<p>0 → 3 Selection/English/ Français 0 → 9</p>

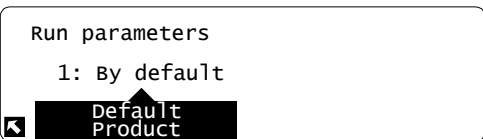
Press the **ACCESS LEVEL** key or the **AUTO EDITION** key then enter a value with the **NUMERIC KEYPAD**. Press the **ENTER** key to confirm.

Press the **LANGUAGE** key to scroll through the various possibilities (flip-flop selection).

Table 4: **General** menu displays

7.2. Run parameters: the "Run" menu

The **Run** menu allows choosing the product profile in place when the device is switched on.

Displays (Power on parameters . menu of the Setup menu).	Meaning of different menus (Going from left to right and from top to bottom).	Field values
 <p>Run menu display</p>	<p>Run parameters (Permanent field) Default Product: choice of the product profile selected by default to carry out a test when device is switched on (applied to a product type).</p>	<p>1 → 40</p>


Press the **Default Product** key, this calls up the product list. Select the product profile desired then press the **OK** key to validate.

Table 5: **Run parameters** menu displays.

7.3. Configuring alarms : the "Alarm" menu

The **Alarms** menu allows thresholds of different alarms triggered in case of failure to be configured. This menu also allows alarm buzzer modulation to be setup.

Activation of this menu calls up the following displays:

Displays (Alarms menu of the Setup menu).	Meaning of different menus (Going from left to right and from top to bottom).	Field values
 <p>Alarms menu display 1</p>	<p>Buzzer : permanent field Modulation: to adjust the intermittence of discontinuous alarm. Test: to test the buzzer.</p>	<p>0 → 100 ON/OFF</p>

Press the **Modulation** button to enter the new value (100%: continuous alarm - 0%: alarm mute).

Use the **Test** button to test the buzzer after modifying its modulation.

Next Display

<p>Alarms setup Sample temperature safety</p> <p>-125 °C 45 °C 10s</p> <p>Thresh- Thresh+ After</p>	<p>Sample temperature safety: permanent field</p> <p>Thresh -: to enter the lower sample temperature the system accepts (alarm triggered after a recognition time)</p> <p>Thresh +: to enter the upper temperature safety the system accepts (alarm triggered after a recognition time)</p> <p>After: setting of the recognition time before upper threshold to be taken account</p>	<p>-150°C → +55°C</p> <p>-150°C → +55°C</p> <p>0 → 120s</p>
<p>Alarms menu display 2</p> <p>If the sample temperature exceeds limits values in the recognition time, here 10s, the system stops the test immediately and the alarm message "Sample temperature safety" is displayed.</p>		
<p>Alarms setup Cooling circuit</p> <p>-1°C/min 120s -3°C/min</p> <p>Thresh1 After Thresh2</p>	<p>Cooling circuit: permanent field</p> <p>Thresh 1: minimal cooling rate in opacity searching phase</p> <p>After: setting of the recognition time before the threshold 1 to be taken account</p> <p>Thresh 2: minimal cooling rate 45s after test starting</p>	<p>-1°C/min → -10°C/min</p> <p>0 à 120s</p> <p>-2°C/min → 5°C/min</p>
<p>Alarms menu display 3</p>		

Table 6: **Alarm** menu screens

7.4. Personalization and access authorization to level 1: the "Lab." menu

The FZP 5G2s can be personalized and so bear the name of the laboratory that acquires it, together with the name of the head of the laboratory. He or she can restrict access to (write protect) certain parameters. The following displays can be called up by activating the **Lab.** menu.

Displays (Lab. menu of the Setup menu).	Meaning of different menus (Going from left to right and from top to bottom).	Field values
<p>Laboratory setup</p> <p>Access Code Lab.name</p>	<p>Laboratory setup: permanent field</p> <p>Access Code: access code to level 1.</p> <p>Lab Name: name of laboratory using FZP 5G2s</p>	<p>Up to 6 characters</p> <p>String</p>
<p>Laboratory setup</p> <p>Manager Title</p>	<p>Laboratory setup: permanent field</p> <p>Manager: name of laboratory manager.</p> <p>Title: title of laboratory manager.</p>	<p>String</p> <p>String</p>

Table 7: **Lab.** menu displays

7.5. Printer configuration: the "Printer" menu

Printer configuration has been dealt with in chapter 4 - Printing and printer setup: The "Print" menu page 3-41 of the current part.

7.6. FZP 5G2s ↔ PC communication: the "PC Link" and "RS232" menus

The FZP 5G2s is an « open » device in more than one respect. Not only it is fully user-definable but it can also communicate with a PC through the following facilities:

- The RS 232C link (connection of the Alan® Input / Output ports through a special adapter supplied, refer to the section 4.3.3.2 page 1-20)
- The RS485 link (connection to the Alan® network, refer to the section 4.3.3.1 page 1-19)
- The Service port (rear panel of the analyzer; see Picture 3 page 1-20)

Each of these communication modes is specialized as follows:

- The RS 232C link enables the FZP 5G2s to send among others test results in ASCII code to a PC or any other computer system (LIMS for example).
 - The RS485 link enable the FZP 5G2s to be connected to the Alan® network
- The Alan network enables if necessary several analyzers to be linked between us (FZP 5G2s and others). They are controlled from the host computer.

- The Service port enables the control software or the memory content to be updated by downloading and the memory content to be saved by uploading (refer to the section 4.4 page 4-66).
- Parameters relating to each of these communication modes are explained below.

7.6.1. RS232C link setup: the "RS232" menu

If the RS 232C link is selected as means of communication mode you will first need the appropriate adapter (see packing list) shipped with the analyzer. This adapter has two RS485 connectors on one side which must both be connected to the Input/Output ports of the Analyzer's Alan[®] network and an RS 232C connector on the other side, which is connected to the PC (refer to the section 4.3.3.2 page 1-20 for more explanations).

When the adapter has been connected, the analyzer automatically detects the presence of an RS 232C link. Then:

- The RS 232C link is declared « in service »
- The RS485 link is declared « out of service »

Parameters of this link are presented in the table below:

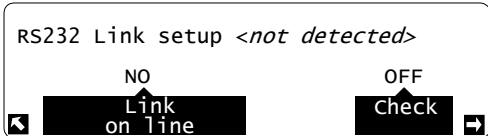
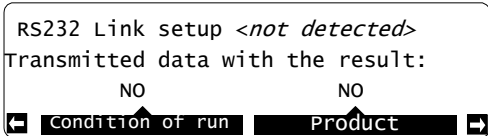
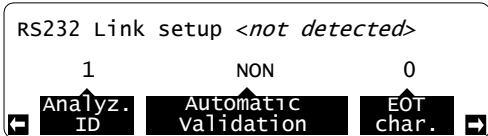
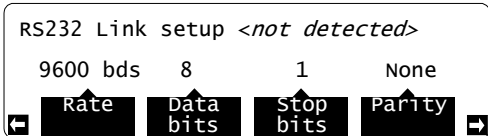
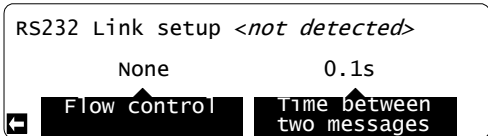

Displays (RS232 menu of the Setup menu).	Meaning of different menus (Going from left to right and from top to bottom).	Field values
 <p>RS232 menu display 1</p>	<p>RS232 Link setup: permanent field Link on line: link established. Check: send a link control raster : <(ISL FZP 5G2s)ES></p>	<p>Yes/No ON/OFF</p>
Press the Link on line or Check key to scroll through the various possibilities (Flip-flop selection).		
		Next display
 <p>RS232 menu display 2</p>	<p>RS232 Link setup: permanent field Data sent with the result : Condition of run: context of the test (e.g. operator name, product profile...) Product: run parameters of the product selected to carry out the test</p>	<p>YES/NO YES/NO</p>
		Next display
 <p>RS232 menu display 3</p>	<p>RS232 Link setup: permanent field Analyzer ID: Analyzer identification. Automatic validation: automatic transmission of the results at the end of the test. EOT char.: end of transmission character (ASCII code).</p>	<p>YES/NO String</p>
Press the Analyzer ID or End Character key then enter a value with the NUMERIC KEYPAD . Press the ENTER key to confirm. Press the Automatic Validation key to scroll through the various possibilities (Flip-flop selection).		
		Next display
 <p>RS232 menu display 4</p>	<p>RS232 Link setup: permanent field Rate: transfer rate (in baud). Data bits: data bits. Stop bits: stop bits. Parity: parity.</p>	<p>9600 bd 7/8 1/2 None/Even/ Odd</p>
		Next display
 <p>RS232 menu display 5</p>	<p>RS232 Link setup: permanent field Flow control: flow control. Time between two messages: when there is no transfer protocol.</p>	<p>{ None RTS/CTS Xon/Xoff ENQ/ACK 0 → 10s</p>

Table 8: RS 232 menu displays

The results messages including the product (if it is selected, move on to screen 2 of the RS232 menu in the table above) are transmitted in the form of a character string in ASCII code. See Appendix B page 77 for the meaning of the content of the messages.

7.6.2. Alan® link setup: the “PC link” menu

When the input/output ports of the Alan® network link interface are connected, the unit automatically detects the presence of the local network link.

 **Note:** The FZP 5G2s has been designed to run under ALAN® management software developed by ISL (refer to the section 4.3.3 - FZP 5G2s / PC link page 1-19).

The parameters of this link are presented and fixed in the table opposite:

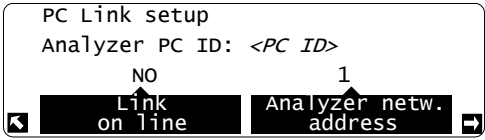
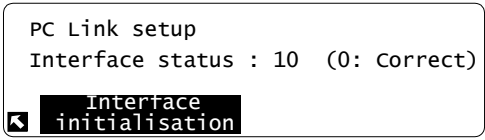
Displays (<i>PC Link</i> menu of the <i>Setup</i> menu).	Meaning of different menus (Going from left to right and from top to bottom).	Field values
 <p>PC Link menu display 1</p>	PC Link setup : permanent field Analyzer PC ID: identifying name of PC on network. Link on line : state of link between FZP 5G2s and the PC. Analyzer newt. Address : FZP 5G2s address on network	Yes/No 1 → 31
Next display		
 <p>PC Link menu display 2</p>	PC Link setup : permanent field Interface status: possible error code linked to the FZP 5G2s⇔PC interface. Interface initialization : initialization of FZP 5G2s⇔PC interface.	

Table 9: *PC Link* menu displays

7.7. Date/Time setting: the "Clock." menu

The date and time are set by means of **Clock.** menu. It is possible to change the date format according to the country in which the FZP 5G2s is being used.

When the **Clock** menu is activated the following display appears:

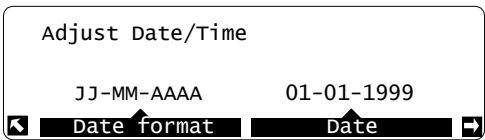
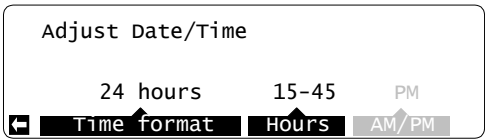
Displays (<i>Clock.</i> menu).	Meaning of different menus (Going from left to right and from top to bottom).	Field values
 <p>Clock menu display 1</p>	Adjust Date / Time: permanent field Date format : to select the format of the date Date : date in the format selected	JJ-MM-AA MM-JJ-AA AA-MM-JJ AA-JJ-MM JJ-MM-AAAA MM-JJ-AAAA AAAA-MM-JJ AAAA-JJ-MM
Next display		
 <p>Clock menu display 2</p>	Adjust Date / Time: permanent field Time format : to select the format of the hour Hours : to enter the hour AM/PM : In the case of a 12-hour clock format select AM or PM	(12/24)h hh-mn AM / PM

Table 10: *Clock* menu displays.

7.8.The "Service" menu

The **Service** menu of the main **Setup** menu is used for analyzer service and it requires a level 2 access authorization. It includes sub-menus from which you can enter or modify the analyzer's internal parameters.

This menu also comprises commands for software updating and memory content resetting / downloading / uploading (data transfer from or to a PC).

The **Service** menu of the main **Setup** menu is explained in section 4 – "The "Service" menu of the "Setup" main menu" page 4-65.

7.9. The /SL menu

Level 3 access is required to access this menu. It is for use by ISL only.

7.10.The About FZP 5G2s menu

The **Station Version** menu lets you access various items of information about your FZP 5G2s analyzer:


FZP 5G2s (c)	ISL, 2002	S/N: 214
Boot 400 (DFFF)		-1 (FFFF)
Software w.x (AAAA)		Txt y.z (BBBB)
 Hardware	C/D	08/03/2003 E

Figure 19: "About NCK2 5G" screen

This menu supplies the following information (from left to right and from top to bottom):

- The name of the unit, the creation year of this analyzer type and the serial number of this unit
- The bootstrap software version and checksum value, the optional bootstrap software version and checksum value
- w.x / y.z: The program software version and checksum value then the text software version and checksum value
- C/D: The unit driver card version / the CPU EPLD version
- The date at which the analyzer has been put back into circulation
- E: The total number of test the analyzer performed

The hardware and software version numbers are always indicated on the bottom line of the list of internal parameters supplied with the analyzer.

8. Access levels and password : the "Access" menu

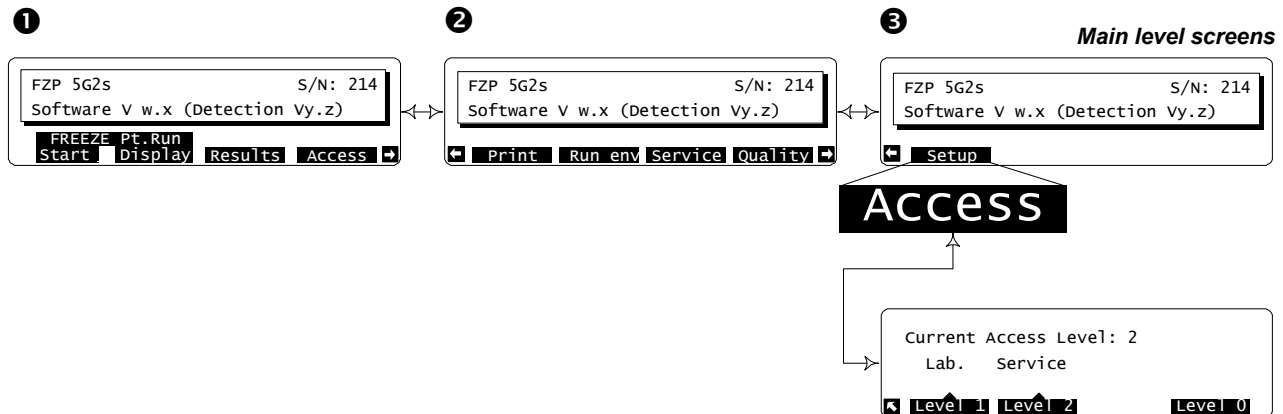


Diagram 9: The Access menu

If entry to a protected level is attempted, the following message is displayed, indicating the current level and the access level requested.

The access codes, previously defined, can be entered by means of two buttons, **Level 1** and **Level 2** (see the **Lab.** setup menu for configuring the access code for level 1 laboratory. Also, see the **Service** setup menu for the definition of the access code for level 2 service (refer to the Part 3 section 4 – “The “Service” menu of the “Setup” main menu” page 4-65).

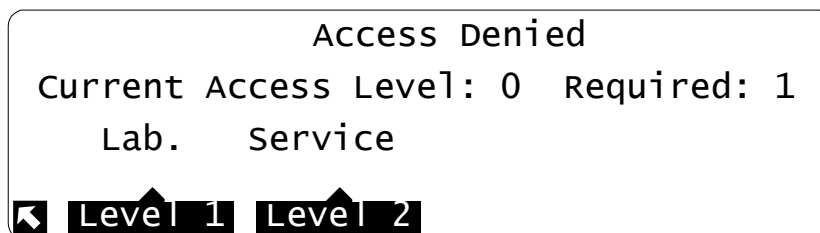


Figure 20: Access to level refused message, indicating that the level is written protected

The main display of the **Access** menu, shown below, enables access to a given level or, if necessary, to zero level.

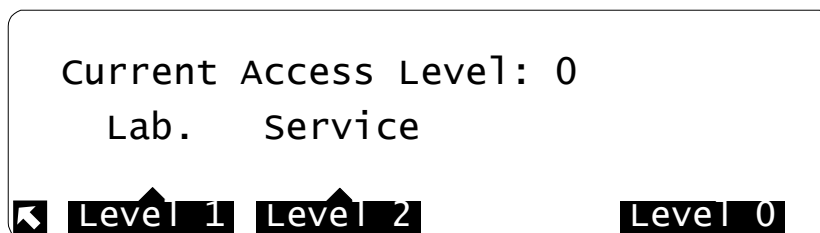


Figure 21: Access menu display

The (digital) access code is entered through the numeric segment. If the code is correct, access is achieved validation with the **ENTRY** key.

Part 4 Maintenance of the FZP 5G2s

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1.Measurement and diagnostic: the "Service" menu

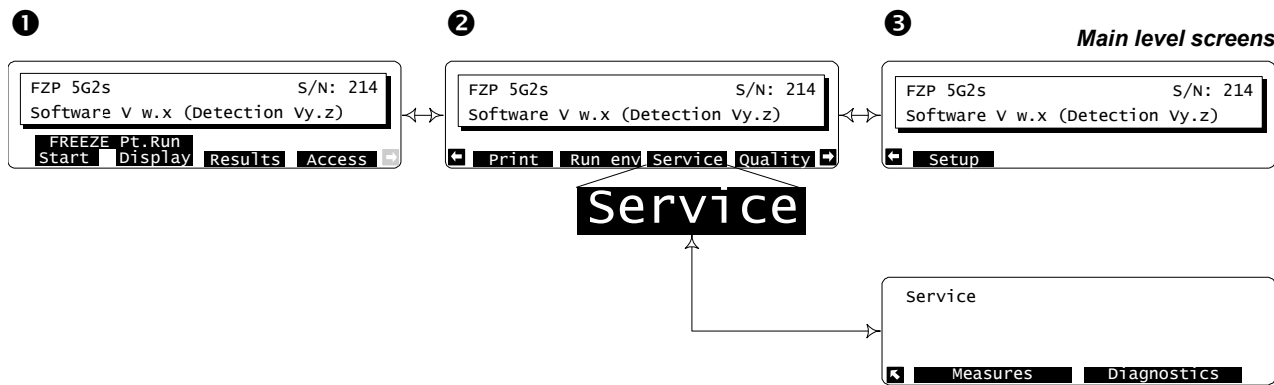


Diagram 10: The Service menu

The **Service** menu is in great part dedicated to maintenance. With this menu it is possible to:

- ↳ Display measures.
- ↳ Slave the main parts of the device.

Activating the **Service** menu calls up the following display:

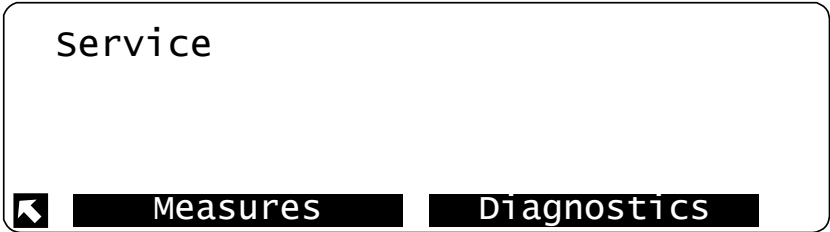


Figure 22: Service menu displays

1.1. Measurement displaying on the FZP 5Gs Analyzer: the “Measures” menu

The **Measures** menu (in the **Service** menu) gives access to the following information, organized into two displays:

Displays	Meaning of different menus
(Measures menu).	(Going from left to right and from top to bottom).
<div>Measures Smp.:20.0°C 0.1°C/min 107.81Ω 47084 Opt: OFF Detection: 7 opacity: 64 Cooling unit: 0 Heat.: 0 00000000 0.0% 0.0% Print</div>	<p>Smp. : sample temperature (°C); variation rate in temperature (reheating or cooling); resistance of sample probe (Ω); analog/digital conversion value</p> <p>Opt: ON/OFF – functioning state of the optical emitter</p> <p>Detection: Number of points received on the detection signal</p> <p>Opacity: Number of points received on the opacity signal (refer tot he section 3.13-37 for the optical detector functioning)</p> <p>Cooling unit: 0 - Effective number of points applied to the cooling unit (information given back by the compressor control board)</p> <p>State indicators (order: D 76543210)</p> <div>[D0 : reserved for ISL use D1 : reserved for ISL use D2 : reserved for ISL use D3 : ventilation 1 = ON / 0 = OFF D4 : temperature alarm D5 : optical stroke D6 : maximum current D7 : optical stroke fault</div> <p>0.0%: Power requested in percentage sent to the cooling compressor control board</p> <p>Heat_0 - Effective number of points applied to the heating (information given back by the control board)</p> <p>0.0%: Power requested in percentage sent to the heating control board</p> <p>Print : printing of two displays</p>
Measures menu screen	
	Next display

Table 11: Measures menu displays

1.2. Diagnostic aid

The **Diagnostics** menu of the **Service** menu can only be accessed by users with the level 2 access authorization (service). This menu allows the various FZP 5G2s power consuming devices to be slaved such as the cooling compressor, the cell or the heating for the good operation to be verified.

Activate the **Diagnostic** key of the **Service** menu gives access to the screens below:

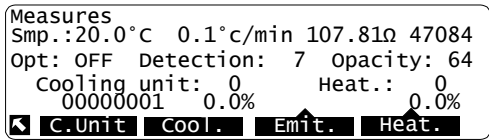
Displays	Meaning of different menus
(Diagnostics menu).	(Going from left to right and from top to bottom).
 <p>Diagnostics menu display</p>	<p>Refer to the previous section 1.1 page 4-59 for explanations on the various information fields.</p> <p>C.Unit: to access to the cooling unit diagnostic menu (refer to the next section)</p> <p>Cool: to enter the power requested to the cooling compressor control board in percentage</p> <p>Emit.: to power on the optical emitter</p> <p>Heat: to enter the power requested to the heating control board in percentage</p>
Activate the C.Unit menu gives access to the cooling compressor diagnostic menu (refer to the next section).	

Table 12: **Diagnostics** menu displays of the **Service** menu

1.3. Cooling compressor diagnostic

Diagnostics has three phases:

1. Initialization: heating to 40°C and regulation for 3 min
2. Cooling: cooling to -110°C. During this phase the values of temperatures to be noted are taken (time required to fall to each notable temperature and effective number of points at this same temperature)
3. Reheating: return to ambient temperature

The **Print** button allows a printout to be made of the cooling compressor parameters (plus the values noted during phase two – see above) which can, if necessary, be sent to ISL's Customer Service for the compressor's condition to be checked.

The following table explains the cooling unit diagnostic procedure to follow:

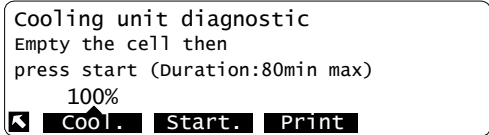
Displays	Meaning of different menus
(C. Unit menu).	(Going from left to right and from top to bottom).
 <p>C. Unit menu display</p>	<p>Cool.: button for entering percentage cooling required (100% by default)</p> <p>Start: menu for running the diagnostic procedure</p> <p>Print: printing cooling compressor parameters stored during the last diagnostic</p>

Table 13: **C. Unit** menu display of the **Diagnostics** menu

2.Adjustment: the "Quality" menu

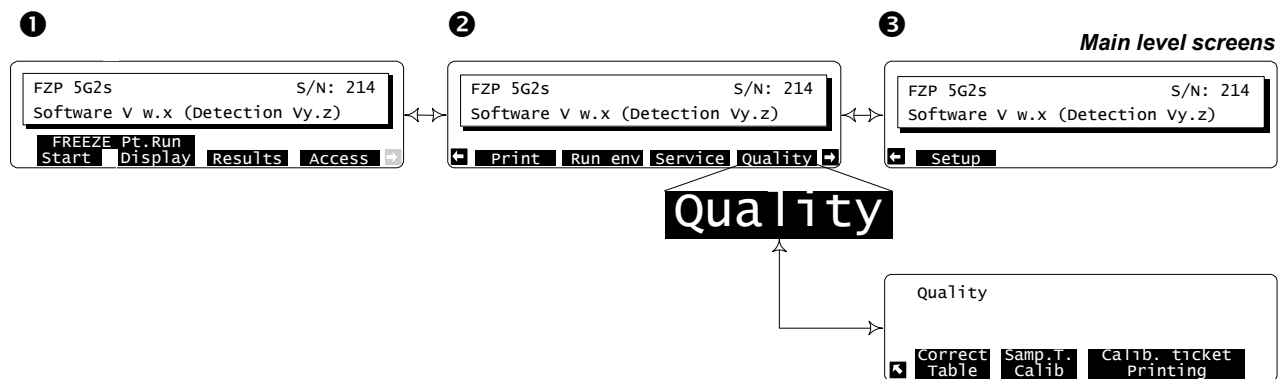


Diagram 11: The Quality menu

The FZP 5G2s measurement instrumentation sometimes requires calibration. How often depends on the user, but it is recommended that all the measurement instruments be adjusted at least once a year. The **Quality** menu has a series of menus dealing with the following adjustments; these are grouped in the display below:

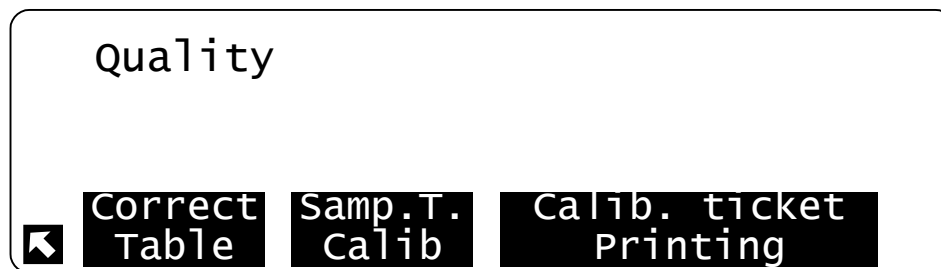


Figure 23: Quality menu display

↳ The "**Correct Table**" menu: sample temperature measurement probe correction table.

↳ The "**Samp. T. Calib**" menu: calibration of sample temperature measurement probe. .

Adjustments carried out in this way can be printed out using the **Calib. ticket Printing** menu.

2.1. Sample probe correction table: the "Correct Table" menu

The **Correct Table** menu makes it possible to enter a correction table for the sample temperature measurement probe. The sample temperature displayed takes this table into account (during tests only).

On activating the **Correct Table** menu the following display appears:

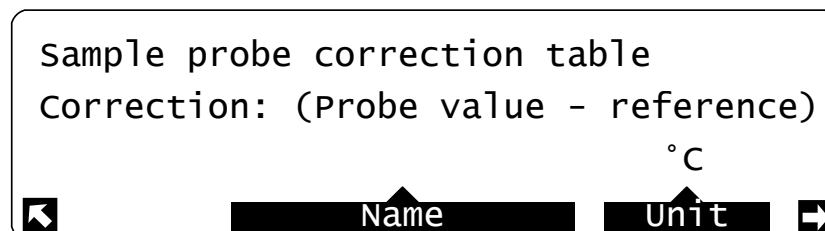


Figure 24: Correct Table menu Display 1

This display allows the name of the correction table to be entered and the table's unit of temperature to be selected.

On a series of displays similar to the display below the correction values can be entered (correction value = value indicated by the probe – reference value), for temperatures from -100°C (-148°F) to +90°C (194°F) (with an increment of 10°C):

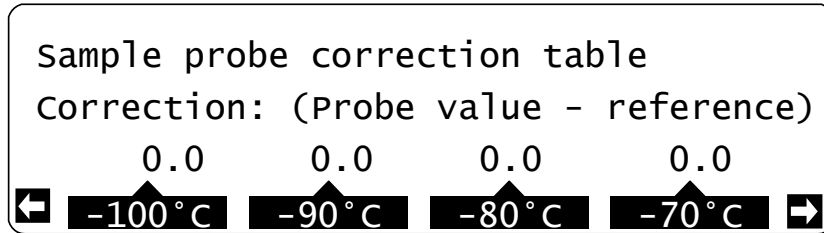


Figure 25: Correct Table menu Display 2

2.2. Calibration of sample temperature measurement: the "Samp. T. Calib." menu

Calibration of the sample temperature measurement is done through the **Samp. T. Calib.** menu of the **Quality** menu.

2.2.1. Tools required

- Flat screwdriver – 1 small, 1 large
- A temperature check box PS100

2.2.2. Procedure

1. Switch off the Analyzer.
2. Remove the Analyzer's cover (refer to the section 5.1- Control Unit housing cover page 4-69).
3. On the Acquisition board (see Picture 7 page 4-69), disconnect the sample temperature sensor from the connection port (J10). Use a small flat-tipped screwdriver to move the small locking pin (refer to the section 5 page 4-69 for electronic boards and port (J10) location).



The connector and the wires of the sensor are extremely fragile. Connection and disconnection must be made with extreme care.

4. Connect the probe simulator connector to the free connection on port J10.
5. Power on the Analyzer.



Turn instrument on for at least 30 minutes to allow the electronics to warm-up and stabilize.

6. Activate the **Samp. T. Calib.** menu of the **Quality** menu then follow the indications on the displays set out below:

Displays	Meaning of different menus	Field values
(<i>Samp. T. Calib.</i> menu).	(Going from left to right and from top to bottom).	
<p>Sample temp. measurement calibration Performed:01/01/2003 Next:01/01/2004 365 days NO</p> <p>← Frequency Test refusal →</p>	<p>Frequency: frequency of calibration. 0 days indicates that there is no check for the passing of the calibration date</p> <p>Test refusal: initiation of test denied when date set for calibration passed.</p>	<p>0 → 365 days</p> <p>Yes/No</p>
<i>Samp. T. Calib.</i> menu Display 1		
		Next display
<p>Sample temp. measurement calibration</p> <p><Name> <Ref.></p> <p>← operator Calib.Reference →</p>	<p>Operator: name of calibration operator.</p> <p>Calib. Reference: calibration reference.</p>	<p>String</p> <p>String</p>
<i>Samp. T. Calib.</i> menu Display 2		
		Next display
<p>Sample temp. measurement calibration CAUTION : be sure the Pt100 simulator is connected, then press (continue).</p> <p>← Cancel Continue →</p>	<p>Cancel: cancel calibration; Return to display 1 of « <i>Samp. T. Calib</i> » menu.</p> <p>Continue: once calibration has been initiated it is no longer possible to cancel it. The keys on the front panel are disabled.</p>	
<i>Samp. T. Calib.</i> menu Display 3		
		Next display
<p>Sample temp. measurement calibration Position simulator on -50°C/-58°F</p> <p>80.312Ω</p> <p>Resistor value →</p>	<p>Position the Simulator knob at -50°C/-58°F.</p> <p>Resistor value: enter, if necessary, the resistance value (Ohm).</p>	
<i>Samp. T. Calib.</i> menu Display 4		
		Next display
<p>Sample temp. measurement calibration Resistor: 80.312 Ω A/D:35052 Press (OK)when the reading is stable.</p> <p>← OK →</p>	<p>When the display becomes almost stable (with the first three characters of the A/D conversion stable) validate with OK.</p>	
<i>Samp. T. Calib.</i> menu Display 5		
<p>Proceed similarly with the Simulator knob set on +50°C/122°F.</p> <p>At the end of operation display 1 of the Quality is displayed.</p>		

Table 14: *Samp. T. Calib.* menu displays

At the end of the calibration procedure:

1. Power off the Analyzer.
2. Disconnect carefully probe simulator connector from the (J10) port, and then reconnect the sampling temperature sensor.
3. Replace the protective cover and fix with the four screws.

3.The “Service” menu of the main printing menu

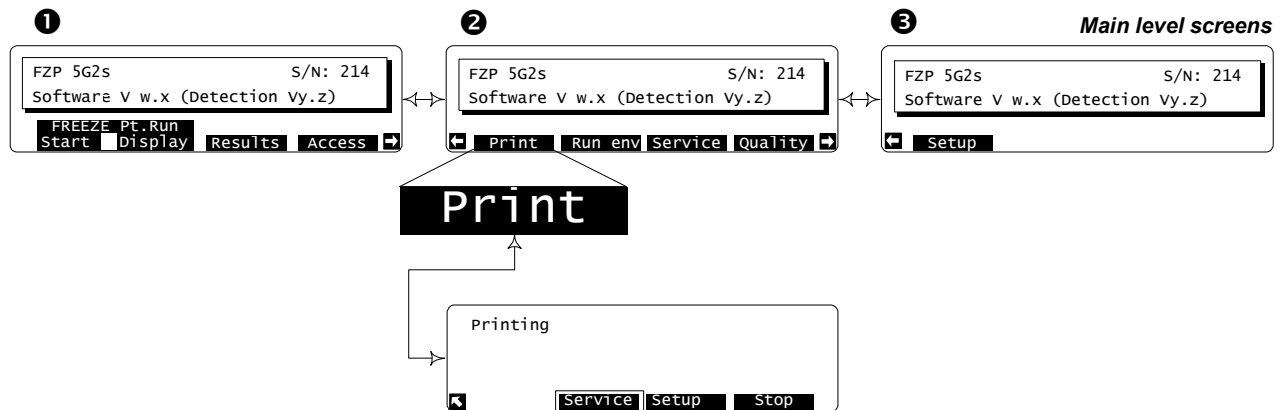


Diagram 12: The **Print** menu

The **Service** menu of the main printing menu is dedicated to Analyzer maintenance and it requires a Level 2 access authorization. Actually, collect the regulation data linked to the device functions and print them enables a diagnostic to be made easier. Data can also be stored in a PC fill.

Activate the **Service** menu of the **Print** menu, the following screen is displayed:

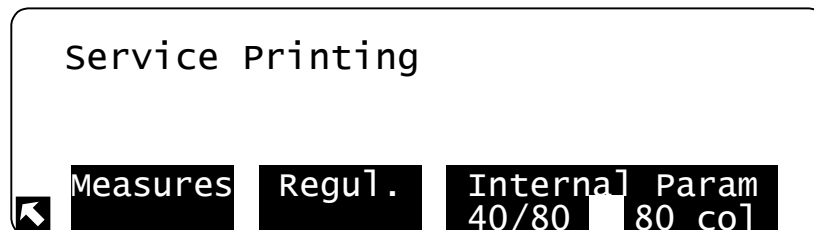


Figure 26: **Service** menu of the main printing menu

The **Service** menu of the main printing menu contains following buttons:

- ↳ **Measures**: to print values measured by the different FZP 5G2s sensors (refer to the section 1.1 - Measurement displaying on the FZP 5Gs Analyzer: the “Measures” menu page 4-59). See Appendix A chapter 5 -page A-73 for a printing example.
- ↳ **Regulation**: regulation monitoring feature – Analyzer internal measures printing each seconds
- ↳ **Internal parameters**: Analyzer internal parameters printing (setup parameters, run parameters and setting values)
 - ◆ **40/80** key: this feature enable the internal parameters to be printed out according to the printer setup (40 or 80 columns)
 - ◆ **80** key: this feature enables the internal parameters to be printed out in 80 columns whatever the printer setup may be.

3.1. Regulation monitoring

The **Regul.** menu enables all regulation data linked to the Analyzer devices to be collected and transmitted to a printer or other peripheral (PC or LIMS). These data are read each seconds during the entire test.

To do so enables a diagnosis to be made easier.

3.2. Internal parameters

A number of internal parameters are stored in the non-volatile memory. They are controlled by the microprocessor with a code checksum stored in the memory.

These internal parameters relate to:

- ↳ Setting values
- ↳ Setup values
- ↳ The Analyzer identifying

One of the first operations we recommend on receiving your Analyzer or before any modification is to print out all service parameters. Keep this list to resort to it in case of problem.

Refer to Appendix A section 6 - page appendix 74 for a printing out example of the Analyzer internal parameters. A copy of the service parameters is also delivered with the Analyzer FZP 5G2s, but it should be kept safe by the person in charge of the laboratory.

4. The “Service” menu of the “Setup” main menu

The **Service** menu is mainly dedicated to the Analyzer service and it requires having level 2 access authorization (the **Setup** menu is explained in Part 3).

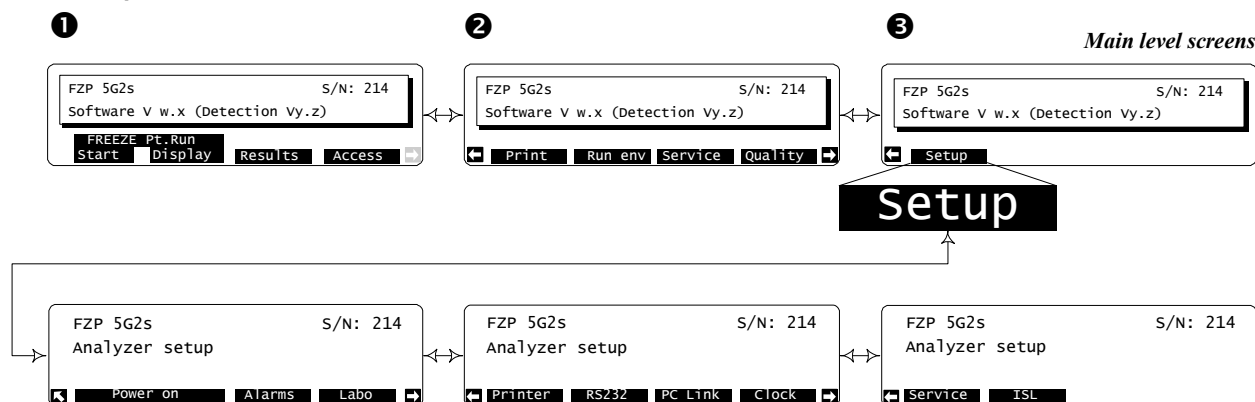


Diagram 13: : Setup menu

This menu contains menus with which regulation parameters can be entered, and setting values and optical detection instrument parameters be modified.

Regulation parameters and setting values are part of internal parameters. They can be directly entered in this menu but it should be avoided modifying them without the ISL authorization. This could question the good working order of the unit.

This menu also group together commands for software update, commands for file transfer to a PC and saved memory deletion and backup.

Activating the **Service** menu of the **Configuration** menu gives access to two displays:

Displays (Service.. menu).	Meaning of different menus (Going from left to right and from top to bottom).	Field values
<p>Service. menu display 1.</p>	<p>Service setup: permanent field</p> <p>AccCode : access code to level 2 (maintenance)</p> <p>Regul. : regulation parameters entry</p> <p>Calib. : entry of setting values, e.g. sample temperature probe</p> <p>ISL UDS: software downloading commands and command for data transfer to PC.</p>	<p>-32768 → 32767</p>
Next display		
<p>Service menu display 2</p>	<p>Service setup: permanent field</p> <p>Detect.: entry of optical detection parameters.</p> <p>Memory init: to access to the deleting menu or initialization menu for backup Ram memory storage areas:</p> <ul style="list-style-type: none"> ➤ RESULTS: deleting of the results stored ➤ PRODUCT : deleting of the product lists ➤ OPER. : deleting of the operator names lists ➤ ALARMS & REVIEW: alarms initialization (with default values) and deleting of the alarms memorized ➤ SAMPLE PROBE: deleting of the correction table value of the sample temperature measurement probe 	

Table 15: **Service** menu displays

4.1. Entering regulation values: the "Regul." menu

The regulation parameters can be entered directly in the screens of the **Regul.** menu (refer to the internal parameters list supplied with the analyzer).

 *Note: These parameters are factory set and they normally must not be modified.*

4.2. Entering calibration values: the "Calib." menu

If data are lost, the calibration values can be entered directly on to the display below, without prior adjustment:

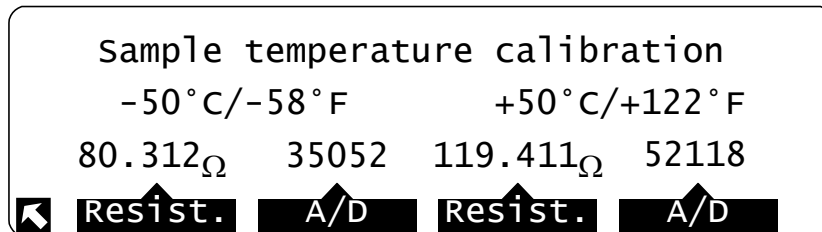


Figure 27: Calib. menu display

Modifying sample temperature adjustment values

High and low reference resistance values are related to the adjustment of the sample temperature. They are calculated by automatic adjustment and do not normally need modifying. If these values are modified manually this is indicated by an asterisk on the display and on the results printout.

4.3. Entering detection values: the "Detect." Menu

The detection parameters can be directly entered in the screens of the **Detect.** menu (refer to the internal parameters list supplied with the analyzer).

 *Note: These parameters are factory set and they normally must not be modified.*

4.4. File download command: the "ISL UDS" menu

The basic Analyzer is delivered with the "ISL UDS" PC program for downloading internal parameters from a PC file to the Analyzer (or the whole content of the non-volatile back-up memory - NVRAM) and for uploading internal parameters of the Analyzer non-volatile back-up memory. Downloading/Uploading is made via the Analyzer "SERVICE" port. It is also possible to update the Analyzer software using an update diskette.

An external connection cable is standard equipment for data flow between PC and Analyzer.

Downloading/Uploading is a function special to this Analyzer.

The Analyzer is in this mode, either:

- by automatic detection of a download request or,
- by an explicit request made via the Analyzer's keyboard.

In the first case, once the Analyzer is in this mode, it can only quit when a connection has been made to the computer.

In the second case, it is preferable not to try to quit download mode. Downloading causes memory loss. If an error is made, it is better to let the downloading continue, and then download again. If the operator stops the Analyzer during downloading, the next time the Analyzer is powered up it will automatically detect that a transfer is necessary.

4.4.1. Transfer procedure

The Analyzer goes into download mode either automatically, or requested by the user. It waits for a PC transmission. When the downloading software is run on the PC, it sends a specific message to the Analyzer.

In replying to this message, the Analyzer indicates the type of downloading required, followed by a safety sequence. The PC then sends data, which is processed by the Analyzer.

When the PC software considers the downloading is finished, it validates this with a signal to the Analyzer.

4.4.2. Installation and start-up of the downloading program

See instructions in the ISL UDS software "Read me" file.

4.4.3. User-requested transfer

Preparation

- Power down the PC and the Analyzer and plug the cable into the "SERVICE" port connector at the back of the Analyzer, and the serial port of the PC.
- Power up the PC and the Analyzer.

Analyzer

- Select the **ISL UDS** menu from the **Service** setup menu (refer to the Table 15 page 4-65). Data uploading and downloading commands are accessible from the following screens:

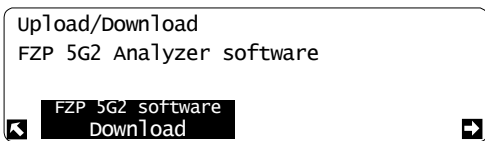
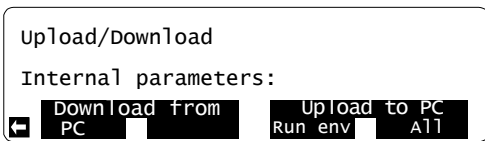
Screen	Meaning of the different menus
(ISL UDS menu of the Service Setup menu)	(from left to right and from top to bottom).
 <p>ISL UDS menu screen 1</p>	<p>FZP 5G2 Analyzer software upload/download</p> <p>FZP 5G2 software download : control software download (code and text)</p>
 <p>ISL UDS menu screen 2</p>	<p>Internal parameters upload/download</p> <p>Download from: to download a PC file</p> <p>PC: to download the whole content of the Analyzer non-volatile back-up memory (the content depends on the command used during the upload, see below)</p> <p>Upload to PC</p> <p>Run env: to upload the prestored products and the operator names list</p> <p>All: to upload the whole content of the NVRAM memory (regulation and calibration parameters, run environments and results)</p>
	Next screen

Table 16: ISL UDS menu of the **Service** setup menu screens

- Select the required functions (the uploading will be to the PC). The Analyzer screen will display the type of transfer.

PC

- Start the transfer on the PC as explained in the ISL UDS software "Read me" file.
- Enter the number (1 or 2) of the serial communications port used (COM).

Downloading Analyzer software

- Key in the data-file name (key in the name and the extension of the file): IsIFZP5G2s.Vxx (xx: software version)
- Validate with **ENTER**.

Downloading internal parameters

- Enter the required file name and then validate with **ENTER**.
- Key in the name and the extension of the file.

A display on the PC informs the operator of the type of operation running.



For internal parameters upload to a PC, use a new file name for each download (for example, use the date as a name – IPDDMMYY.NVM).

Moreover, it will be interesting for the user to identify the type of the file uploaded with its extension name.

Upload to PC:

- ↳run environment: file1.env
- ↳all: file2.nvm

End of transfer

If the transfer was OK:

- The Analyzer is automatically reinitialized.



4.4.4. Transfer fails or screen not lit

If the transfer fails, the Analyzer will automatically detect a download request. Also, on powering up, if the Analyzer screen does not light up, the Analyzer will similarly detect a download request.

- Power down the PC and the Analyzer.
- Power up the PC and the Analyzer.
- Run the downloading program as explained above (section 4.4.3 page 4-67). If downloading is necessary, the Analyzer will detect this automatically.

When the Analyzer is waiting for a download, the red LED will flash every second.

A download in progress is indicated by rapid flashing, which is related to the rate of data transfer.

5. Maintenance

5.1. Control Unit housing cover disassembling

ADVERTISEMENT

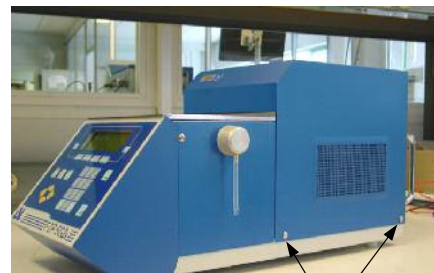
CAUTION! Switch off the Analyzer and disconnect it from the mains before removing the housing.

If the service operations require you to switch on the Analyzer, switch it off again before disconnecting or removing any electrically powered components.

- Switch off the Analyzer and disconnect it from the mains.
- Using an Allen® key remove the 2 screws in low corners each side of the Analyzer and the screw above the screen.
- Grip the housing near the top between your two hands and pull towards the top to remove it.



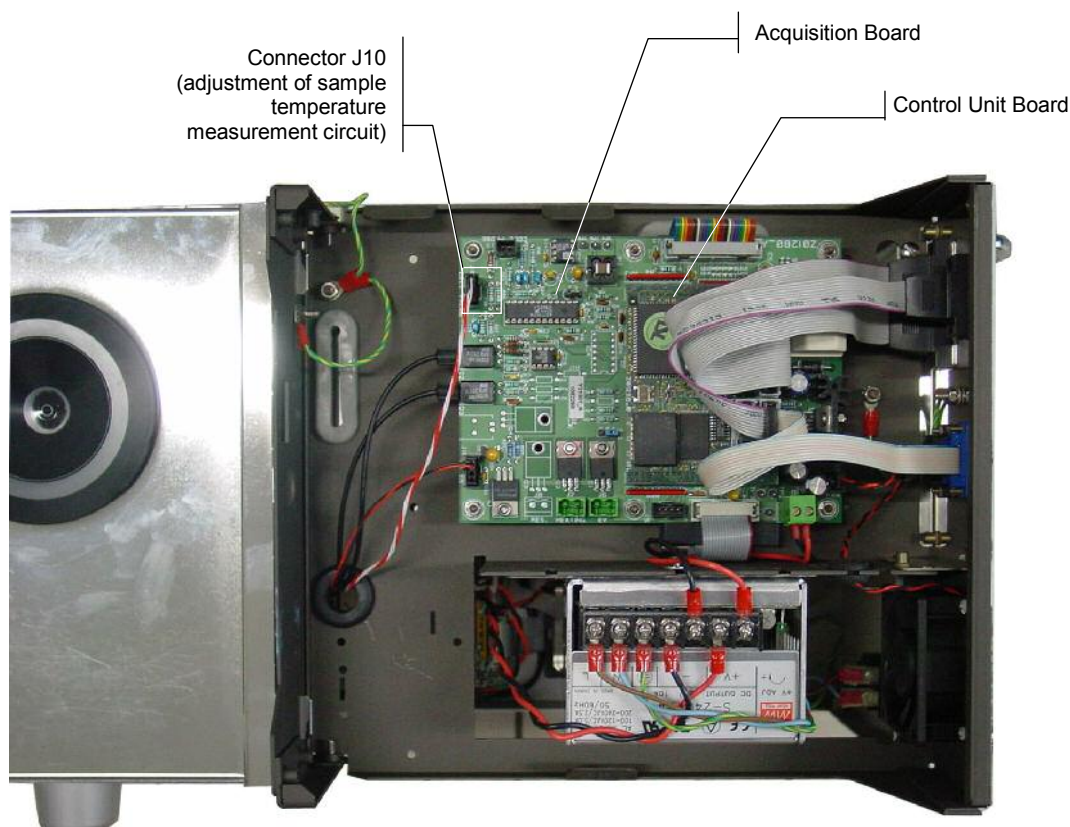
CAUTION! Replace the housing cover before switching on the Analyzer.



- Proceed in the reverse order to reassemble the housing cover.

5.2. Location of the Acquisition Board

Use the relevant photograph to locate the various components.



Picture 7: Internal topview of the FZP 5G2s Analyzer



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Appendix A – Printing type examples

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1 -Result ticket printing – detailed format (with product)

12/01/2004 16:05 ISL FZP 5G2s Software V 5.4 S/N: 214
 10/04/2003 10:43 Op:ML
 Prod: 1 ID:
 Freezing point: -35.5°C
 Cd: -45.6°C Co: -74.2°C
 Do: -68.7°C
 Detection V5.3
 Product: 1
 Rounded: Yes Stop: -120°C

2 -Product parameter printing

12/01/2004 16:05 ISL FZP 5G2s Software V 5.4 S/N: 214
 Product: 1
 Rounded: YES Stop: -120°C

3 -Operator name list printing

12/01/2004 16:05 ISL FZP 5G2s Software V 5.4 S/N: 214
 Operators list
 1: ML 6:
 2: GL 7:
 3: SL 8:
 4: LL 9:
 5: 10:

4 -Calibration ticket printing

12/01/2004 16:05 ISL FZP 5G2s Software V 5.4 S/N: 214
 Calibration ticket
 Sample Temp. measurement calibration
 Operator: LL Calibration reference :
 Calibration performed: 07/01/2003 Next calibration: 07/01/2004
 -50°C/ -58°F: 80.312ohms A/D: 35052 +50°C/+122°F: 119.411ohms A/D: 52118
 Sample probe corr table:
 Laboratory name :
 Laboratory Manager name: Title:
 Comments:
 Date: Signature:

5 -Analyzer measure printing

12/01/2004 16:05 ISL FZP 5G2s Software V 5.4 S/N: 214
 Measures
 Sample temperature: 21.1 °C R: 108.22 ohms A/D:6821
 Cooling: 0.0% 0 Flags: 00000011 Heating: 0.0% 0
 Detection: 9 pts Opacity: 9 pts



6 -Internal parameter printing

12/01/2004 16:05 ISL FZP 5G2s Software V 5.4 S/N: 214

Internal parameters

General setup

Run setup

Access level: 0 Auto edition:2

Product: 1

Alarms setup

Sample T: t-: 125°C t+: 45°C 10s

Buzzer modulation : 30%

Cooling: t1: -1C/m 120s t2: -3 C/m

Laboratory setup

Laboratory Manager name:

Laboratory name:

Title:

Printer setup

Result printing

Printer: Deskjet color

Auto: Yes Format: Ticket Content: Detail

Line feeds: 2 lines

RS232 setup

Transmitted data with the result

On line: NO Analyzer ID : 1

Rate: 9600 Data bits : 8

End of transmission character: 0

Time between two messages

Conditions of run: NO Product: YES

Automatic result validation:NO

Stop bits: 1 Parity:None

Flow control: None

if no flow control used: 0.1s

PC link setup

On line: NO Address: 0

Analyzer PC ID: ISL FZP 5G2

Date/Time Setup

Date: DD-MM-YYYY

Time: 24 hours

Regulation parameters of the pump

Kp1: 2.5 Ki1: 0.10 Kd1: 0.0 Km: 10.0 Kp2: 5.0 Ki2: 0.50 Kd2: 0.0

Sample Temp. measurement calibration

Calibration frequency: 365 days

-50°C/ -58°F: 80.312ohms A/D: 35052

Next calibration date: 27/03/2004

Start test refused: NO

+50°C/+122°F: 119.411ohms A/D: 52118

Sample probe correction table

-100°C: 0.0 -90°C: 0.0

-60°C: 0.0 -50°C: 0.0

-20°C: 0.0 -10°C: 0.0

20°C: 0.0 30°C: 0.0

60°C: 0.0 70°C: 0.0

-80°C: 0.0 -70°C: 0.0

-40°C: 0.0 -30°C: 0.0

-0°C: 0.0 -10°C: 0.0

40°C: 0.0 50°C: 0.0

80°C: 0.0 90°C: 0.0

Detection parameters

SBd: 25 CCd: 10 CdmCo : 40

SC2 : 3 Ofz: 0.09 Abf: 0.9

CDd: 5 ZmDd : 10 ZcDd: 5

ISL 400/DFFF -1/FFFF 5.4/27F 5.4/57F5 0/4 08/03/2003 496



Cooling unit parameters

S / N : M100B3L161/9 22/01/2003

Runs: 35

28/03/2003

83:03	0:26	0:16	4:26	0:26	0:40
0:00	0:00	0:00			

05/02/2003	10	0	100%
------------	----	---	------

17	1min25	241
0	2min18	239
-9	2min50	238
-17	3min20	237
-34	4min35	236
-51	6min02	233
-68	7min51	231
-87	10min26	231
-100	12min41	230
-110	14min56	230

27/03/2003		100%
------------	--	------

17	1min20	251
0	2min10	248
-9	2min41	247
-17	3min10	246
-34	4min20	244
-51	5min44	240
-68	7min27	236
-87	9min56	230
-100	12min23	227
-110	14min58	216



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Appendix B – RS232 link features on FZP 5G2s

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In this document, **analyzer** is used for the ISL FZP 5G2s while **host computer** designates the computer to which the ISL FZP 5G2s is connected.

1 -Interface features

EIA-RS 232C serial link

Rate : 300 to 19200 BPS

Data bits : 7, 8

Stop bits : 1, 2

Parity : none, odd, even

Switchable on-line / off-line state

Pre-defined message transmission available for test.

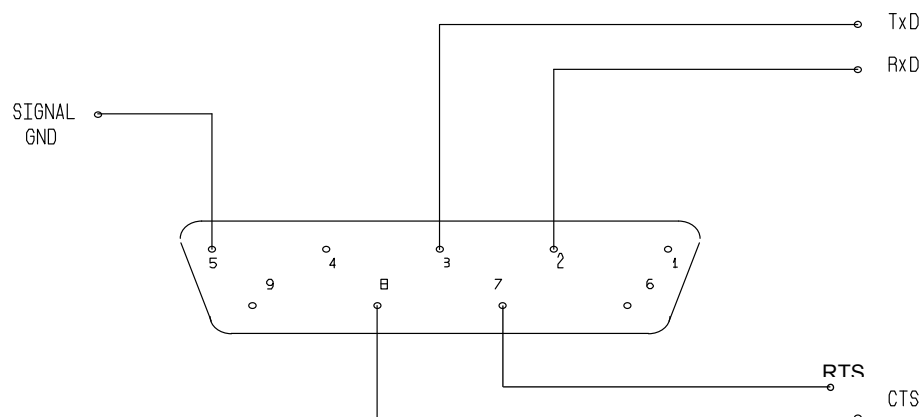
Possibility to define an identifier (number) for the analyzer.

Possibility to activate result auto-validation.

Automatic detection of the RS232 interface cable adapter.

2 -Outlet connector broaching

The RS 232C connector of the adapter is a 9-pin connector. The pin configuration is as shown below.



EIA RS 232C interface

Line status in standby: +12 V (MARK),

Input signals used: CTS / RTS.

3 -Communication protocols

Flow control / Protocol can be :

- None
- RTS/CTS
- Xon/Xoff
- ENQ/ACK

Flow control	Type	Comments	
None		Transmitted messages are sent without any way to stop them from the host computer. However, a special parameter ("Time between two messages") in the ISL analyzers allows to define a pause between to successive message from 0.0 s to 10.0 s (by step of 0.1 s) <i>Note : This time is applied between 2 entire messages (not between characters)</i>	
RTS / CTS	Hardware	Existing signals defined in the RS232C interface standard are used to control the transmission. Connect the host computer serial RTS signal to the analyzer CTS signal. When the input buffer of the host computer is full, the RTS signal changes its state. Seeing its CTS signal changing, the analyzer stops transmission until CTS changes again. <i>Note: This hardware handshake is controlled by the communication hardware devices and can stop / restart transmission between any characters</i>	
Xon / Xoff	Software	This well-known handshake is qualified as "software protocol" because it is controlled by the host computer reception software to control the data flow . If the software needs time to process the last incoming message, it can send the Xoff character to the analyzer which immediately stops the transmission, until it receives from the host computer the Xon character.	Xon = 11H Xoff = 13H
ENQ / ACK	Software	This is a full protocol. It allows flow control and data acknowledgment . The transmission is fully controlled by the host computer, which must send an ENQ (enquiry) character. Any message must be acknowledged by the host computer by sending a ACK character. <i>Note: There is no need to define a time between messages because the message sequencing keeps pace with the ENQs sent by the host computer.</i>	Developed by ISL this protocol is detailed below.

4 -ENQ / ACK protocol details

The host computer must acknowledge all messages from the analyzer.

Should communication fail, only the host computer can decide whether or not to abort transmission.

Analyzer response time on receiving ENQ:	< 100 ms
Waiting time for message acknowledgment:	2 sec
Results transfer delay after end of test (delay for ENQ) :	not limited
Number of transmission of the same result message on receiving NAK:	not limited (end with ACK or EOT reception)

Request, reception and acknowledgement of results

The host computer uses the ENQ code (05H) to ask the analyzer if any results are ready to be sent.

If the analyzer has no results to send, it replies ACK (06H). The host computer does not have to reply to this ACK.

	ANALYZER	HOST COMPUTER
No result available		ENQ
No result	ACK	

If the analyzer has results, it starts their transmission.

On receiving the message, the host computer must check it (checksum) and must reply ACK (06H) or NAK (15H), depending on whether the message was correct or not.

If there are several fruitless communications, the host computer may decide to abort transmission by sending an EOT (04H) character.

	ANALYZER	HOST COMPUTER
Successfull transmissions		ENQ
1 result message	XXXXX	
		ACK
		ENQ
Next result	YYYYY	
		ACK
		ENQ
No more result	ACK	

	ANALYZER	HOST COMPUTER
Result sent, faulty reception		ENQ
1 result message	XXXXX	(not properly received)
		NAK
		ENQ
Same message	XXXXXX	(not properly received)
		NAK
		ENQ
Same message	XXXXXX	(not properly received)
Host ends the communication		EOT Abort

5 -Transmitted data

Example:

```
( 1,"R ","JetA+2.51%GI","G4-IS/07-N3 ", 1,99, 0,9999.9, -44.0,9999.9,9999.9,9999.9, 1 " ")8E
( 1,"C ","HC ",99,99,9,999.9,99,9,999.9,"15/07/1999", 4,"16:43 ")5F
( 1,"T ","Jet (°C) ", 0, 0,99,999,999,9999.9,-120.0, 999,999, 1)09
```

The data that can be transmitted are divided in 3 groups:

Group	Contents	Transmitted...
Result	See messages R below	Always
Run context	See messages C below	If defined in the RS232 link setup
Test product	See message T below	If defined in the RS232 link setup

To be transmitted, a result must be validated:

- ↳ Manual validation must be performed at the analyzer level (refer to the section 3.1 page 3-37.). The transmission is only possible after the validation.
- ↳ Automatic validation can be set in the RS232 link setup (refer to the section 7.6.1 page 3-53, screen 2 of the **RS 232** menu).

5.1 -Message format


Messages are in ASCII code.

Character strings are enclosed within " " (double quotes).

They start with an opening bracket (

They finish with a closing bracket), 2 characters **CK**, and the characters : **CR**, **LF** and **EOT**

- CK (2 characters) = checksum = the 2 least significant digits (expressed in ASCII) of the result of the hexadecimal sum of all the preceding characters, including the brackets.
- CR (1 non printable character) = Carriage Return = 0Dh
- LF (1 non printable character) = Line Feed = 0Ah
- EOT (1 non printable character) = End Of Transmission character, programmable in the RS232 setup menu (If = 0, there is no end of transmission character).

 **The value 999 indicates that the field is not being used (reserved for a future use).**

5.2 -The result message

As indicated above, if the transmission of data on the RS 232C link has been validated (automatic or manual validation), the result message is systematically transmitted.

Temperatures expressed in °C or °F, corrected or not by barometric correction, depending on the product programmed.

Example:

```
( 1,"R ","JetA+2.51%GI","G4-IS/07-N3 ", 1,99, 0,9999.9, -44.0,9999.9,9999.9,9999.9, 1 " ")8E
```

Meaning of result message fields (under ticket form) from left to right

Message R

Fields	Format	Number of Characters	Field value
Analyzer no.	from 00 to 99	2	
Type of message	string	2	" R " = result
ID - sample	string	12	
Sample number	string	12	
Product number	from 00 to 99	2	
Reserve	99	2	Reserved for number of cut
Temperature unit	00 to 01	2	0 = °C, 1 = °F
Reserve	-999.9 to 9999.9	6	Reserved for the presumed number
FREEZE result	-999.9 to 9999.9	6	
Reserve	9999.9	6	
Reserve	9999.9	6	
Reserve	9999.9	6	
Type of test end	00 a 05	2	
Adjustments to be made indicator	string	1	" " = OK, " * " = to be made

Type of test end:

- 1 = Freezing point detected
- 2 = Freezing point not detected
- 3 = Not used
- 4 = Crystallization not detected

Contents of Freeze Result field according to type of test end:

- 1: Freezing point temperature rounded if requested in the product
- 2: No temperature recorded
- 3: Not used
- 4: test stop temperature (set in the run product, see message T below)

5.3 -The run context message

Example:

```
( 1,"C ", "HC ",99,99,9,999.9,99,9,999.9,"15/07/1999", 4,"16:43 ")5F
```

Meaning of run context message fields (under curve form) from left to right

Message C

Field	Format	Numbers of Characters	Comments
Analyzer no.	from 00 to 99	2	
Type de message	string	2	" C " = Context
Operator name	string	12	
Reserve	99	2	
Reserve	99	2	
Reserve	9	1	
Reserve	999.9	5	
Reserve	99	2	
Reserve	9	1	
Reserve	999.9	5	
Date	string	10	
Date format	from 00 to 07	2	{ 0 : JJ-MM-AA 1 : MM-JJ-AA 2 : AA-MM-JJ 3 : AA-JJ-MM 4 : JJ-MM-AAAA 5 : MM-JJ-AAAA 6 : AAAA-MM-JJ 7 : AAAA-JJ-MM
Time	string	6	

5.4 -The test product message

Example:

(1,"T ","Jet (°C) ", 0, 0,99,999,999,9999.9,-120.0, 25,999, 1)09

Meaning of product message fields (under curve form) from left to right

Message T

Field	Format	Numbers of Characters	Comments
Analyzer no.	de 00 a 99	2	
Message type	string	2	" T " = test product
Product name	string	12	
Temperature unit	00 or 01	2	0 = °C 1 = °F
Type of analysis	00	2	
Reserve	99	2	
Reserve	999	3	
Reserve	999	3	
Reserve	9999.9	6	
STOP temperature	-999.9 à 9999.9	6	
Reserved	-99 à 999	3	
Reserve	999	3	
Rounding of result	00 or 01	2	0 = No 1 = Yes

5.5 -RS232 link test message

(ISL FZP 5G) E5

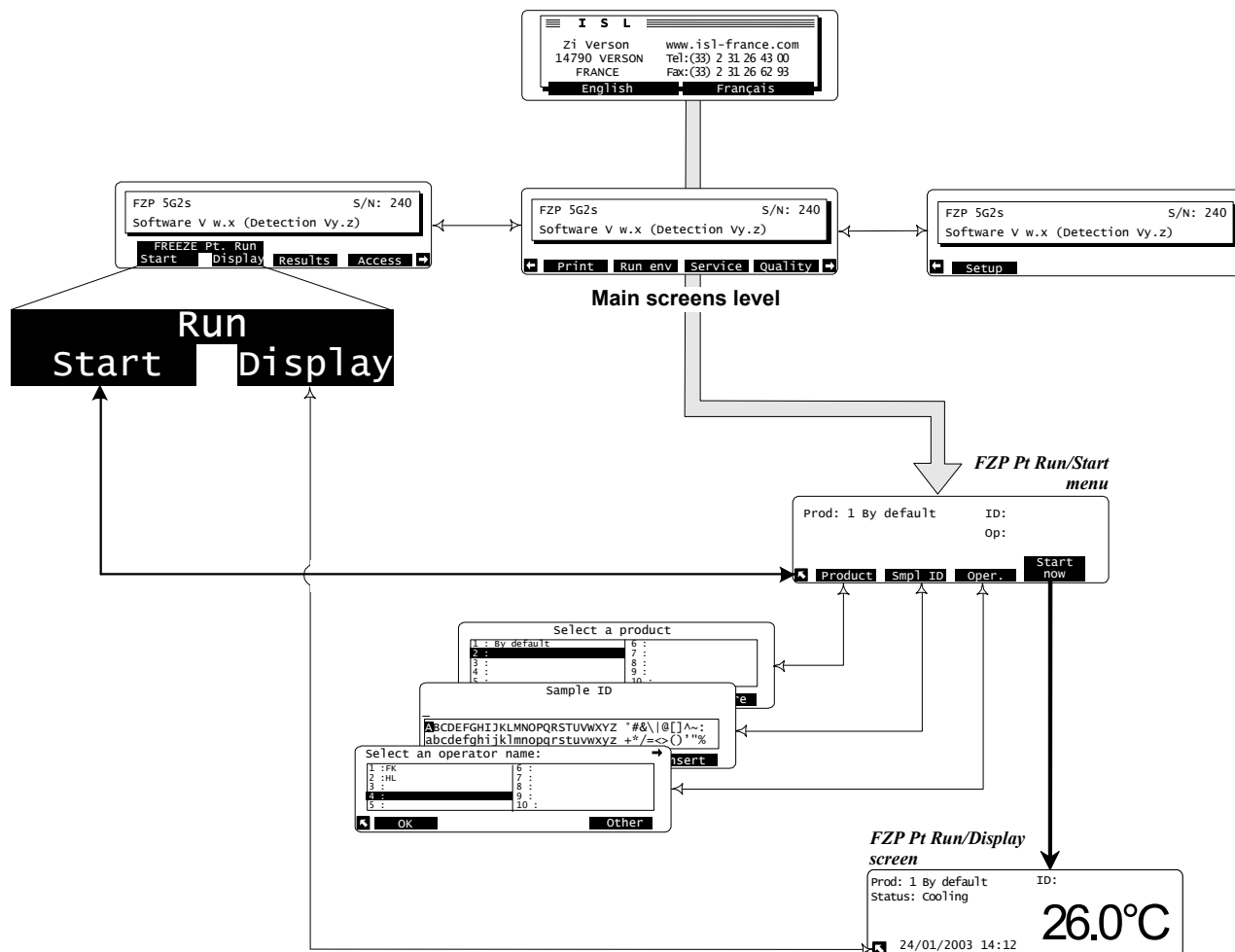
6 -RS232 cost

There is neither option, nor extra fee for RS232 software and hardware (including the RS485 / RS232 cable adapter) which is provided as standard.

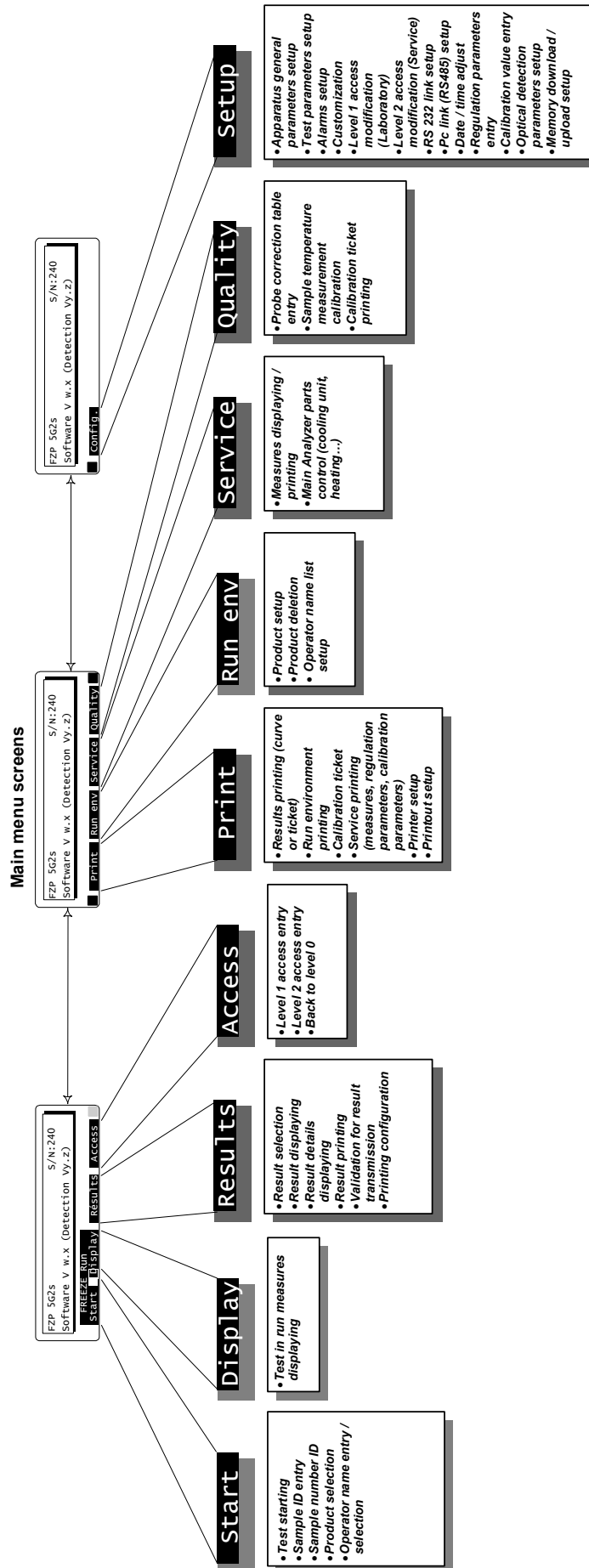
Appendix C - Sequence charts

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1 -Test launch diagram



2 -Action chart



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